

READING *across* the CURRICULUM

Non fiction text for Guided Silent Reading Lessons

FORCES of NATURE

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SCHOOL SITE LICENCE

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Forces of Nature - Explanations

Contents

TEACHING NOTES

Using the Text 3

Using the Follow Up Activities 4

Students Text Page nos	Follow up Activities Page nos
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SET 1 : Instructional Reading Age 7-8 years

1:1	Why Do We Have Day and Night?	7	8
1:2	Where Does Wind Come From?	9	10
1:3	What Causes Rain?	11	12
1:4	What is a Fire Tornado?	13	14

SET 2 : Instructional Reading Age 8-9 years

2:1	How Does a Geyser Work?	15	16
2:2	Why is the Sea Salty?	17	18
2:3	Do Thunder and Lightning Always Go Together?	19	20
2:4	What is a Sandstorm?	21	22

SET 3 : Instructional Reading Age 9-10 years

3:1	What are Hurricanes?	23	24
3:2	Why Do Earthquakes Happen?	25	26
3:3	What Causes the Tides?	27	28
3:4	What is at the Bottom of the Sea?	29	30

SET 4 : Instructional Reading Age 10-12 years

4.1	What Causes Rainbows?	31	32
4.2	How Do Volcanoes Work?	33	34
4.3	How Do Waterspouts Form?	35	36
4.4	What is the Water Cycle?	37	38

SET 5 : Instructional Reading Age 12-14+ years

5.1	Mirages - Are they Real?	39	40
5.2	What Causes Tsunamis?	41	42
5.3	What is a Tornado?	43	44
5.4	What Causes the Aurora?	45	46

Appendix 48

SharpReading ONLiNE - A Framework for Whole School Reading Instruction 49

SharpReading ONLiNE - A Guided Reading Routine That Gets Results 50

Learning Outcomes in Reading, Science, Writing 51

Explanation of the Activities 53

Activity Exemplars 55

USING THE TEXT



Reading across the Curriculum: FORCES of NATURE

This resource includes twenty explanations, covering a wide range of age-graded reading levels. Here you will find the resources and the know-how to put in place a quality reading programme that will equip your students to be successful life-long readers.

Three Possibilities for Using Non-Fiction Text

Here are some options for using this resource.

1. A Vehicle for the Explicit Teaching of Comprehension Strategies

Here the goal is the explicit teaching and guided practice of comprehension strategies (or decoding strategies if there is still a need).

The content becomes secondary – guided reading is the context for strategy practice. If your group only gets half way through a text then so be it. You will have achieved your goal if your students have spent 20-30 minutes getting the mileage they will need to habituate a new strategy.

Turn to page 49 for more details on Comprehension Strategy Instruction and page 51 for Learning Outcomes in Reading.

2. An Investigation in Science

You can use your instructional reading group time to wrestle with some content that is applicable to another curriculum area, in this instance Science. This was the intention behind the title 'Reading across the Curriculum'.

Our big question to guide an investigation on the Forces of Nature

Turn to page 52 for Learning Outcomes in Science.

3. Exploration of the Explanation Genre

Using your instructional reading time to support your writing programme makes sense. If your students are writing explanations then use this resource to read and study good models of the genre. Focus on identifying the structure and the language features of the explanations and learning to critique the text being read.

Turn to page 52 for Learning Outcomes in Written Language

Important Challenges

The first option is aimed at continuing the process of 'Learning to Read' - the teaching and practice of reading strategies so that your readers can decode and construct meaning as they read. This requires a clear understanding of what these strategies are and a methodology to teach them. Did you know that it takes up to 18 months of regular practise to habituate a new mental strategy?

The second option can only be done meaningfully if the students have the skills to construct meaning for themselves. They need an understanding of the text before they can engage in the applying, analysing, synthesizing required.

The third option requires even higher order evaluative processing and critical thinking to extract criteria and evaluate the quality of writing.

Each options presents an increasingly complex outcome. Instead of tackling the reading programme in a haphazard, piecemeal manner ('a bit of this and a bit of that') it is important to have a sound understanding of the developmental progression of reading strategies that does exist and make provision for this in the way we teach.

See what this developmental progression looks like on page 49.

Sign-up for **SharpReading ONLINE**, our online training programme which offers you quality professional training in Comprehension Strategy Instruction.

USING FOLLOW-UP ACTIVITIES



Let's face it; follow-up activities are an organisational necessity if you want to be able to spend time doing the real work in your reading programme - guided reading with small ability groups.

But they must be more than just that. Here is a list of follow-up shoulds and a should not that have stood the test of time.

Follow-up activities...

1. Should be preceded by guided reading of the text

An instructional programme that requires students to read a passage by themselves and then work on some follow-up activities isn't an instructional reading programme – there is no instruction. Guided reading ensures that the text has been unpacked and understood. The reader is now ready to do something with the information.

2. Should be preceded by explicit teaching of the strategies and thinking required by the activity

If an activity is going to be meaningful for the learner there must be time for a clear explanation and some modelling of what is required. Give students many opportunities with the same activity so that they can develop some fluency with the strategies involved. The challenge comes from applying the same activity to new content.

3. Should be seen as an important part of 'after reading' comprehension strategy development

A chance to revisit text and think more deeply about the information or the message that has been read has great benefits for the reader. Under the umbrella of 'Use it or Lose It', reworking or deeper processing of ideas and information makes it more memorable (assists transference from short term memory to long term memory), teaches the reader to be strategic about the information they read and by so doing, empowers and motivates them.

4. Should involve choice and challenge

Providing a variety of activities that cater for individual learning preferences is very motivating for the learner. Working with thinking tools such as Bloom's Taxonomy provides the reader with a powerful schema for their own metacognition and transfers across all learning. Give them choice about the activities they do. Don't kill the enthusiasm by being pedantic or wringing it dry.

5. Should have an audience

Doing endless work for the teacher has a very limited appeal. The brilliant and creative thinking that goes into challenging follow-up activities must find the light of day – you must have a system for publishing best work, a chance to share it with the class.

6. Should not go on and on for ever

The reading programme shouldn't be dominated by follow-up activities. There should be a natural flow from the intensity of a guided reading lesson, a time for follow-up and further study of that text, followed by a personal reading programme for mileage – a chance to practice and habituate the strategies you are teaching. Make sure that your students understand that their reading programme is about READING.

See pages 53-58 for a further explanation of how we achieve these things with the follow-up activities in this resource, and some exemplars to help with your teaching and modelling of these activities.

Explanations and Activities

Set 1: RA 7-8

Set 2: RA 8-9

Set 3: RA 9-10

Set 4: RA 10-12

Set 5: RA 12-14

Why Do We Have Day and Night?

Day and night follow each other in an order that never changes. We are ruled by this order. We have day and night because our light comes from the sun but not all parts of the earth face the sun at the same time.



The sun is very important for life on earth. During the day, it gives us light and heat. Not so during the night. That is because the earth is spinning around, or **rotating**. At any one time, some parts of the earth are facing the sun and are in the light and other parts are facing away from the sun and are in the dark. Therefore, at exactly the same time, it is day in some parts of the world and night in others. That is why, on opposite sides of the world, some people are waking up and others are going to bed.

We do not notice that the earth is turning (rotating) because it is as smooth as a well-oiled machine. But, the speed at which the Earth **rotates** is 2,200 kilometres an hour! Did you think that you were going that fast? It takes 24 hours (1 day) for the earth to make one complete turn or **rotation**.

The sun does not turn. The sun does not travel across the sky. It stays still. We say, 'The sun rises in the east and sets in the west.' It seems like that to us. But really, it is the earth turning that makes it seem as though the sun is moving. The direction that the earth rotates in is towards the east. So, we see the sun appear in the east and disappear in the west.

Although it is hard to imagine, night time is when we are in the shadow of our own planet. Day time is when the sun shines directly on to our part of the earth.

GLOSSARY

rotate - To turn like a wheel around an axis or fixed point. The earth rotates around an axis that goes from the north pole to the south pole.

rotation - a completed turn around an axis or a fixed point.



Headings and Trigger Words

Use this column to write down a heading and trigger words to summarise each paragraph - **SharpReading Stage 5B**

Why Do We Have Day and Night?

Set 1:1 Activities



REMEMBERING - What are the facts

1. Why is the sun important for life on earth?
2. How long does it take for 1 rotation of the earth?
3. Write a question like the ones above. You must be able to find the answers in the explanation.

UNDERSTANDING - Show that you understand the information

4. Draw a picture to show that you understand what it means for the earth to rotate. You could use this drawing in your infographic (Activity 8).
Include labels to explain what is happening in your drawing.
5. Choose one paragraph from the article. Decide on a heading for that paragraph. Write down some 'trigger words' (words that trigger the information in your head). Use the heading and trigger words to rewrite the paragraph in your own words.

APPLYING - Using the information in another way

6. **Poetry**
Write a poem or a rap song about how day and night chase each other around the earth.
7. **A Day (and night) in the Life of a Sunflower**
You are a sunflower. Write in your diary about how things change for you during the day and at night.

ANALYSING - Using an infographic to tell the story

8. Create a fun INFOGRAPHIC to explain all the information you have read about why we have day and night and how it works.
An infographic is a combination of pictures, diagrams, symbols, flow charts, words and numbers to show information in a fun and interesting way.

CREATING - Coming up with new ideas

9. Design something in space that would keep the sun shining on your house all the time so that you would never have to go to bed.
Remember to include diagrams, labels, and descriptions to explain your interesting ideas.

EVALUATING - How good is this explanation

10. Do you think this explanation was well written?
Give a reason for each of your ratings.

♦ **Was there an introduction?**

Did the first paragraph tell you what the explanation was going to be about?

Introduction : Rate 1-10

♦ **Were the ideas set out in paragraphs?**

Could you see how the author went from one idea to the next?

Organisation : Rate 1-10

♦ **Did the author wrap-up the explanation**

Did the author make a summary of the topic at the end?

Conclusion : Rate 1-10

♦ **Was the information interesting?**

Did you stay interested from the beginning to the end?

Writing style : Rate 1-10

♦ **Was the explanation clear? Did you get it?**

Do you understand what the author was trying to tell you?

Clarity : Rate 1-10

Where Does Wind Come From?



Wind is moving air. All around the earth, air is on the move!

What causes it? Wind is caused by the sun. It shines on the earth, warming it. As the earth warms, it heats the air above it. This warm air rises up because warm air is lighter than cold air. Then cooler air moves in below to replace it. This moving air is what we call wind.

When warm air rises, it lowers the **air pressure**. When the air is cold and heavy, it raises the air pressure. Wind blows from places where there is **high pressure** to places where the **pressure** is **low**. The more different the two air pressures are, the stronger the wind is.

It is easy to understand this by looking at **sea breezes**. The sun shines on the coast. But land heats more quickly than the sea. The warm air over the land rises up and so cooler air is drawn in from the sea to replace it. This moving air is a sea breeze because it comes from the sea. Sea breezes are like a lovely cool fan on a hot day!

However, at night the opposite thing happens. The land cools down more quickly than the sea. Therefore, at night, warm air rises from the sea and cooler air comes from the land to replace it. This is called a **land breeze** because it comes from off the land.

In a small way, the sea breeze and the land breeze show what happens on our planet. Hot air rising from tropical places attracts winds from both north and south. Near the cold poles, high pressure pushes winds away either towards the south or north.

Of course, the earth is spinning as well. This means that wind is always moving and changing around our world.

GLOSSARY

air pressure- the downward pressure of the atmosphere or the air in any particular place. Warm air is light and lowers the pressure downwards (low pressure). Cold air is heavy and increases the pressure downwards (high pressure).

sea breeze - the wind comes off the sea and blows onto the land.

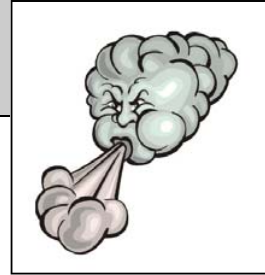
land breeze - the wind comes off the land and blows out to sea.

Headings and Trigger Words

Use this column to write down a heading and trigger words to summarise each paragraph - **SharpReading Stage 5B**

Where Does Wind Come From?

Set 1:2 Activities



REMEMBERING - What are the facts

1. What happens to the air when the earth warms?
2. Which heats up more quickly - the land or the sea?
3. Write a question like the ones above. You must be able to find the answers in the explanation.

UNDERSTANDING - Show that you understand the information

4. Draw pictures to show the difference between high air pressure and low air pressure. You could use this drawing in your infographic (Activity 8).
Include labels to explain what is happening in your drawing.
5. Choose one paragraph from the article. Decide on a heading for that paragraph. Write down some 'trigger words' (words that trigger the information in your head). Use the heading and trigger words to rewrite the paragraph in your own words.

APPLYING - Using the information in another way

6. **Poetry**
Write a poem or a rap song about the differences between land breezes and sea breezes.
7. **Picture Book**
Write a story for a 5 year old about invisible Mr Wind and what causes him to move around.

ANALYSING - Using an infographic to tell the story

8. Create a fun INFOGRAPHIC to explain all the information you have read about wind.
An infographic is a combination of pictures, diagrams, symbols, flow charts, words and numbers to show information in a fun and interesting way.

CREATING - Coming up with new ideas

9. It is a very hot day with no breeze. How could you use what you know about the wind to get a nice cool breeze going.
Remember to include diagrams, labels, and descriptions to explain your interesting ideas.

EVALUATING - How good is this explanation

10. Do you think this explanation was well written?
Give a reason for each of your ratings.

♦ **Was there an introduction?**

Did the first paragraph tell you what the explanation was going to be about?

Introduction : Rate 1-10

♦ **Were the ideas set out in paragraphs?**

Could you see how the author went from one idea to the next?

Organisation : Rate 1-10

♦ **Did the author wrap-up the explanation**

Did the author make a summary of the topic at the end?

Conclusion : Rate 1-10

♦ **Was the information interesting?**

Did you stay interested from the beginning to the end?

Writing style : Rate 1-10

♦ **Was the explanation clear? Did you get it?**

Do you understand what the author was trying to tell you?

Clarity : Rate 1-10

What Causes Rain?

It starts to rain when water drops in the clouds grow so heavy they fall out of the sky and down to the ground. It is always raining somewhere on earth!



Evaporation is something else that is always happening. This is when water changes from a liquid into an invisible **gas** and is taken up into the air. For example, your wet clothes hanging on the line get dry when the water that is in them gets heated up and turns into invisible **water vapour** and leaves your clothes.

If the air carrying the water vapour rises (because of wind or mountains) it cools down. This is because the higher you go, the colder it becomes. As the moist air cools, the invisible water vapour starts changing back into very small water droplets and we can see this as a cloud. When this happens it is called **condensation**.

A cloud is made of millions of these tiny water droplets. These droplets are so tiny that they float. As more and more droplets form they bang together, join and become larger. It takes many droplets to become one drop of rain. When the drops are big and heavy enough, they fall to earth.

In order for it to rain, there is always the same process. Firstly, warm air rises. Secondly, the air cools. Thirdly, condensation happens. Lastly, the water droplets join together and fall as rain.

Do you love the rain? Aren't you happy when you look out your window and it is pouring down? Yeah right! But although we might not always think so, rain is a wonderful thing. It gives us fresh water. It feeds plants and animals. Not much can live in a place without rain.

GLOSSARY

gas - something that is not solid or liquid. It has no shape or size of its own and is usually invisible.

evaporation - when water is heated up and changes from a liquid into a gas.

water vapour - water in the form of a gas - very small droplets of water that cannot be seen.

condensation - when something loses heat and changes from a gas into a liquid.

Headings and Trigger Words

Use this column to write down a heading and trigger words to summarise each paragraph - **SharpReading Stage 5B**

What Causes Rain?

Set 1:3 Activities



REMEMBERING - What are the facts

1. Why do the water drops in the clouds fall down to earth?
2. What is a cloud made up of?
3. Write a question like the ones above. You must be able to find the answers in the explanation.

UNDERSTANDING - Show that you understand the information

4. Draw a picture or diagram to show that you understand how your clothes get dry on the washing line. You could use this drawing in your infographic (Activity 8).
Include labels to explain what is happening in your drawing.
5. Choose one paragraph from the article. Decide on a heading for that paragraph. Write down some 'trigger words' (words that trigger the information in your head). Use the heading and trigger words to rewrite the paragraph in your own words.

APPLYING - Using the information in another way

6. **Poetry**
Write a poem or a rap song about the rain using some of the information you have read in the explanation.
7. **Adventure Story**
Write a story about some water droplets that meet in a cloud and the adventure they have as the cloud gets more and more crowded with other droplets.

ANALYSING - Using an infographic to tell the story

8. Create a fun INFOGRAPHIC to explain all the information you have read about rain.
An infographic is a combination of pictures, diagrams, symbols, flow charts, words and numbers to show information in a fun and interesting way.

CREATING - Coming up with new ideas

9. Use what you know about rain to design a rainmaker in your garden so that you never have to worry about watering your garden.
Remember to include diagrams, labels, and descriptions to explain your interesting ideas.

EVALUATING - How good is this explanation

10. Do you think this explanation was well written?
Give a reason for each of your ratings.

♦ **Was there an introduction?**

Did the first paragraph tell you what the explanation was going to be about?

Introduction : Rate 1-10

♦ **Were the ideas set out in paragraphs?**

Could you see how the author went from one idea to the next?

Organisation : Rate 1-10

♦ **Did the author wrap-up the explanation**

Did the author make a summary of the topic at the end?

Conclusion : Rate 1-10

♦ **Was the information interesting?**

Did you stay interested from the beginning to the end?

Writing style : Rate 1-10

♦ **Was the explanation clear? Did you get it?**

Do you understand what the author was trying to tell you?

Clarity : Rate 1-10

What is a Fire Tornado?

Fire tornadoes do not happen very often. When they do, they can be very dangerous. Fire tornadoes are seen as spinning **columns** of fire. They look startling and dramatic. They can also move really fast!



A fire tornado happens within a fire that has already started. Bush fires can break out in places where everything is dry because of a long time without rain. If strong dry winds are also blowing, fire tornadoes may form. Hot air rises. As a bush fire burns, the hot air rises up and cooler air rushes in below to replace it.

In dry windy weather, this gusty air can become a swirling **column**. It spins round and round. It sucks in fire and smoke like a hungry beast. It burns fiercely and grows even bigger. The size of a fire tornado can be between 10 and 50 metres tall! They do not normally last long but they can destroy a lot in a short time. They can speed through the bush or forest, lighting tree after tree. Several of them can move together along a fire front like attacking soldiers.

A spinning fire tornado can also throw sparks far and wide for hundreds of metres. This causes the fire to spread rapidly. It can trap fire-fighters who may become surrounded by fires and so they usually leave the area when a fire tornado becomes active because they cannot control it. Fire tornadoes are very dangerous in towns and cities. They can quickly destroy houses and everything in their path.

Did you know that fire tornadoes have also been seen in **erupting volcanoes**? It is not very likely that you will see a fire tornado as they are quite rare. If you do see one, stay away from it!

GLOSSARY

column - a long cylinder shape that stands upright.

volcano - a hole in the earth's surface where hot molten rock and gas from the centre of the earth is forced out.

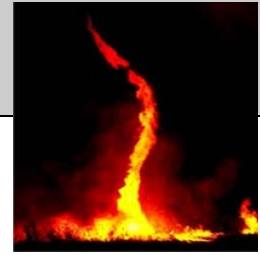
erupting volcano - a volcano that is live - hot ash and molten rock is coming out of it.

Headings and Trigger Words

Use this column to write down a heading and trigger words to summarise each paragraph - **SharpReading Stage 5B**

What is a Fire Tornado?

Set 1:4 Activities



REMEMBERING - What are the facts

1. How tall can fire tornados be?
2. How do fire-fighters get trapped by fire tornadoes?
3. Write 2 questions like the ones above. You must be able to find the answers in the explanation.

UNDERSTANDING - Show that you understand the information

4. Draw a picture to show that you understand how a fire tornado spreads. You can use this drawing in your infographic (Activity 8).
Include labels to explain what is happening in your drawing.
5. Choose one paragraph from the article. Decide on a heading for that paragraph. Write down some 'trigger words' (words that trigger the information in your head). Use the heading and trigger words to rewrite the paragraph in your own words without going back to the original text.

APPLYING - Using the information in another way

6. **Poetry**
Write a poem or a rap song about freaky fire tornadoes that 'spin and suck like a hungry beast'.
7. **Newsflash**
Write a newspaper report about some fire-fighters that get caught in a fire tornado.

ANALYSING - Using an infographic to tell the story

8. Create a fun INFOGRAPHIC to explain all the information you have read about fire tornadoes.
An infographic is a combination of pictures, diagrams, symbols, flow charts, words and numbers to show information in a fun and interesting way.

CREATING - Coming up with new ideas

9. You live in a place where there are lots of bush fires and fire tornadoes. Design some special equipment that will protect your house.
Remember to include diagrams, labels, and descriptions to explain your interesting ideas.

EVALUATING - How good is this explanation

10. Do you think this explanation was well written?
Give a reason for each of your ratings.

♦ **Was there an introduction?**

Did the first paragraph tell you what the explanation was going to be about?

♦ **Were the ideas set out in paragraphs?**

Could you see how the author went from one idea to the next?

♦ **Did the author wrap-up the explanation**

Did the author make a summary of the topic at the end?

♦ **Was the information interesting?**

Did you stay interested from the beginning to the end?

♦ **Was the explanation clear? Did you get it?**

Do you understand what the author was trying to tell you?

Introduction : Rate 1-10

Organisation : Rate 1-10

Conclusion : Rate 1-10

Writing style : Rate 1-10

Clarity : Rate 1-10

How Does a Geyser Work?

Geysers are natural **eruptions** of hot water and steam that shoot up suddenly from out of the ground. They are quite rare. There are only about a thousand geysers in the whole world. They can only happen when all the conditions are perfect for them.

Firstly, there must be a supply of water underground. This could be an underground spring or just surface ground water that has seeped down.

Secondly, there needs to be an underground area that stores the water, and at least one **geyser tube** that can carry it up to the surface. These tubes must all be water-tight so that the pressure that builds up is not released by water escaping through small cracks in the rock.

Thirdly, there must be heat. All geysers are found close to **active volcanoes**, where hot rocks from the centre of the earth have come close to the surface. These hot rocks heat the stored water.

If there is water stored underground and volcanic heat, a geyser can work. The underground water heats up until it bubbles and boils. Some of it becomes steam. The pressure builds up, just like with an electric jug coming to the boil. At last, water and steam shoot up through the **geyser tubes** and out of the vent at the top. The geyser has erupted!

Once an eruption has finished, water refills the empty storage areas. Then it is heated and boiled all over again. In time, there will be another eruption. Some geysers erupt regularly but others erupt only now and then.

The size of a geyser can vary from quite small jets of water to huge ones 50 – 60 metres tall. 'Isn't that dangerous?' you ask. Yes, it is, because they are sudden and burning hot.

Perhaps the most famous place to see a geyser in action is Yellowstone National Park in America. Half of all the world's geysers are there. Of course everyone must stand in safe areas to watch.

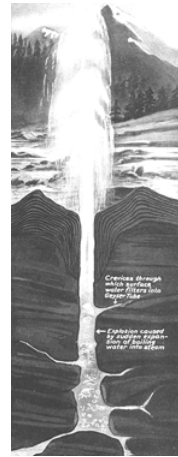
GLOSSARY

eruption - a sudden violent outburst.

Geyser tube - an underground passageway that reaches up to the surface.

volcano - a hole in the earth's surface where hot molten rock and gas from the centre of the earth is forced out.

active volcano - a volcano that is working not asleep (dormant).

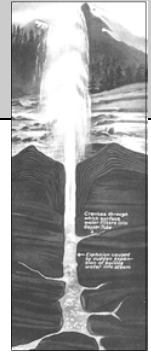


Headings and Trigger Words

Use this column to write down a heading and trigger words to summarise each paragraph - **SharpReading Stage 5B**

How Does a Geyser Work?

Set 2:1 Activities



REMEMBERING - What are the facts

1. How many geysers are there in the whole world?
2. How high are the biggest geysers?
3. Write 2 questions like the ones above. You must be able to find the answers in the explanation.

UNDERSTANDING - Show that you understand the information

4. Draw a picture or a diagram to show that you understand what is happening underground when a geyser erupts. You can use this drawing in your infographic (Activity 8).
Include labels to explain what is happening in your drawing.
5. Choose one paragraph from the article. Decide on a heading for that paragraph. Write down some 'trigger words' (words that trigger the information in your head). Use only the heading and trigger words to rewrite the paragraph in your own words.

APPLYING - Using the information in another way

6. **Poetry**
Write a poem or a rap song about geysers using some of the information you have read in the explanation.
7. **A Day in the Life of a Geyser**
You are a geyser. Write in your diary about how things are heating up and you know that something has to give.

ANALYSING - Using an infographic to tell the story

8. Create a fun INFOGRAPHIC to explain all the information you have read about geysers.
An infographic is a combination of pictures, diagrams, symbols, flow charts, words and numbers to show information in a fun and interesting way.

CREATING - Coming up with new ideas

9. You have a geyser under your house. Show how you can use this to heat your house and supply you with hot water.
Remember to include diagrams, labels, and descriptions to explain your interesting ideas.

EVALUATING - How good is this explanation

10. Do you think this explanation was well written?
Give a reason for each of your ratings.

♦ **Was there an introduction?**

Did the first paragraph tell you what the explanation was going to be about?

Introduction : Rate 1-10

♦ **Were the ideas set out in paragraphs?**

Could you see how the author went from one idea to the next?

Organisation : Rate 1-10

♦ **Did the author wrap-up the explanation**

Did the author make a summary of the topic at the end?

Conclusion : Rate 1-10

♦ **Was the information interesting?**

Did you stay interested from the beginning to the end?

Writing style : Rate 1-10

♦ **Was the explanation clear? Did you get it?**

Do you understand what the author was trying to tell you?

Clarity : Rate 1-10

Why is the Sea Salty?

Sea water has a lot of salt in it. Have you ever had a big mouthful of sea water by mistake? If so, you will know just how salty it is! An accidental gulp or two of salty sea water will not hurt you. However, humans cannot drink sea water to survive. They become very sick if they try.



So why is sea water so different from the fresh water in lakes and rivers and how does the salt get there? No it doesn't come from a salt shaker! Salt is a **mineral** that can be found in rocks and there are two ways that it finds its way into the sea.

Firstly, rain and rivers carry salt to the sea. Water is very good at dissolving minerals so rain and rivers do this as they run over rock. The scientific name for salt is **sodium chloride**. It is the same ordinary stuff that you sprinkle on your food. There are other minerals carried to the sea by water but sodium chloride is by far the most common one. So there is salt in fresh water. But it is such a small amount that we cannot taste it.

Once salt reaches the ocean, it stays there. The water that has carried it may **evaporate** up into the air. It may fall again as rain, **dissolve** more salt and bring it also to the sea in a river. This process has been going on for a very, very, very long time! It has made sea water different from fresh water.

Not long ago, it was found that salt comes into the sea in another way as well. Hot water springs from under the sea floor bring dissolved salt into the sea. Also, volcanoes that erupt under the ocean throw out hot rocks. The sea water reacts with these, dissolving some of the minerals, including salt.

Thankfully, the **salinity** (amount of salt) in the oceans has reached a steady level. There is enough fresh water entering the sea as rain, melting ice and rivers to keep it this way.

GLOSSARY

mineral - a substance that occurs naturally in the rocks and in the ground.

dissolve - when a solid disappears or is changed to become a liquid.

evaporate - to change a liquid into a gas or vapour usually by heating it.

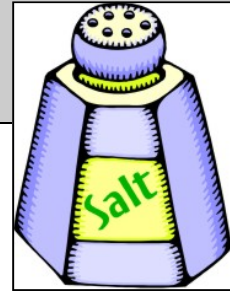
salinity - the amount of salt something has in it.

Headings and Trigger Words

Use this column to write down a heading and trigger words to summarise each paragraph - **SharpReading Stage 5B**

Why is the Sea Salty?

Set 2:2 Activities



REMEMBERING - What are the facts

1. What are the two different ways that salt gets into the sea?
2. What happens if you drink too much sea water?
3. Write 2 questions like the ones above. You must be able to find the answers in the explanation.

UNDERSTANDING - Show that you understand the information

4. Draw a picture or a diagram to show that you understand where the salt in the sea comes from. You could use this drawing in your infographic (Activity 8).
Include labels to explain what is happening in your drawing.
5. Choose one paragraph from the article. Decide on a heading for that paragraph. Write down some 'trigger words' (words that trigger the information in your head). Use the heading and trigger words to rewrite the paragraph in your own words without going back to the original text.

APPLYING - Using the information in another way

6. **Poetry**
Write a poem or a rap song about how the water in the sea is salty and what will happen to you if you drink too much of it.
7. **Picture Book**
Make a picture book for a 5 year old about Sammy Salt who lives in a rock and how the water comes and washes him into the sea.

ANALYSING - Using an infographic to tell the story

8. Create an INFOGRAPHIC to explain all the information you now have read about the salty sea.
An infographic is a combination of pictures, diagrams, symbols, flow charts, words and numbers to show information in a fun and interesting way.

CREATING - Coming up with new ideas

9. The sea is getting so salty that even the fish are dying!!! Design a new invention that will save the planet.
Remember to include diagrams, labels, and descriptions to explain your interesting ideas.

EVALUATING - How good is this explanation

10. Do you think this explanation was well written?
Give a reason for each of your ratings.

- ♦ **Was there an introduction?**
Did the first paragraph tell you what the explanation was going to be about?
- ♦ **Were the ideas set out in paragraphs?**
Could you see how the author went from one idea to the next?
- ♦ **Did the author wrap-up the explanation**
Did the author make a summary of the topic at the end?
- ♦ **Was the information interesting?**
Did you stay interested from the beginning to the end?
- ♦ **Was the explanation clear? Did you get it?**
Do you understand what the author was trying to tell you?

Introduction : Rate 1-10

Organisation : Rate 1-10

Conclusion : Rate 1-10

Writing style : Rate 1-10

Clarity : Rate 1-10

Do Thunder and Lightning Always Go Together?

Thunder and lightning are like best friends. Where one goes, the other goes too. This is because thunder is actually the sound made by lightning. They are always found together.



Lightning is an electric flash which happens naturally. It often occurs in huge clouds called **cumulous clouds**. In these enormous clouds, there are many tiny bits of ice, which are frozen rain. As they are thrown together by the wind, they make lots of energy.

The energy in the cloud attracts the energy in the ground, gathering it to places that stick up; towers, lone trees, even people. Eventually the energy from the cloud will jump to meet the energy on the ground. This causes a spark, and electricity flashes. Zap!

Lightning is very hot! It is six times hotter than the surface of the sun! The enormous heat suddenly changes the air around the flash of lightning. The air expands very quickly, making a shock wave. This is the sound we hear as thunder. So, lightning causes thunder. Sometimes, thunder is a long, grumbling rumble. Sometimes, it is a sudden loud crack or an echoing sound like two or three claps.

Although lightning and thunder happen at almost the same time, sometimes we see lightning long before we hear thunder. This is because light travels much faster than sound. Knowing this, you can guess how far away the lightning is by timing the space between the flash and the bang. Allow two kilometres for every five seconds. This gives you a rough idea of how far away the lightning is. If you see the lightning and hear the thunder almost together, the lightning is very close.

Remember, lightning is dangerous. It can start fires and hurt or kill people. It is best to shelter in a house or car, not under a tree, and wait for those two best friends, Flash and Bang, to go away.

GLOSSARY

cumulous cloud - a long low fluffy white cloud that is round at the top and flat at the bottom.

Headings and Trigger Words

Use this column to write down a heading and trigger words to summarise each paragraph - **SharpReading Stage 5B**

Do Thunder and Lightning Always Go Together?

Set 2:3 Activities



REMEMBERING - What are the facts

1. How hot is lightning?
2. What is the best thing to do when there is lightning?
3. Write 2 questions like the ones above. You must be able to find the answers in the explanation.

UNDERSTANDING - Show that you understand the information

4. You see a flash of lightning and 10 seconds later you hear thunder. Draw a picture or a diagram to show you understand why there is a gap between the two. You could use this drawing in your infographic (Activity 8).
Include labels to explain what is happening in your drawing.
5. Choose one paragraph from the article. Decide on a heading for that paragraph. Write down some 'trigger words' (words that trigger the information in your head). Use the heading and trigger words to rewrite the paragraph in your own words without going back to the original text.

APPLYING - Using the information in another way

6. **Poetry**
Write a poem or a rap song about the two friends Flash and Bang.
7. **Adventure Story**
Write a short story about two boys who get lost in a thunder and lightning storm.

ANALYSING - Using an infographic to tell the story

8. Create a fun INFOGRAPHIC to explain all the information you have read about thunder and lightning.
An infographic is a combination of pictures, diagrams, symbols, flow charts, words and numbers to show information in a fun and interesting way.

CREATING - Coming up with new ideas

9. Design a device that starts up when there is a flash of lightning, records the time difference between the flash and the sound of thunder, and can tell you how far away the centre of the storm is.
Remember to include diagrams, labels, and descriptions to explain your interesting ideas.

EVALUATING - How good is this explanation

10. Do you think this explanation was well written?
Give a reason for each of your ratings.

♦ **Was there an introduction?**

Did the first paragraph tell you what the explanation was going to be about?

Introduction : Rate 1-10

♦ **Were the ideas set out in paragraphs?**

Could you see how the author went from one idea to the next?

Organisation : Rate 1-10

♦ **Did the author wrap-up the explanation**

Did the author make a summary of the topic at the end?

Conclusion : Rate 1-10

♦ **Was the information interesting?**

Did you stay interested from the beginning to the end?

Writing style : Rate 1-10

♦ **Was the explanation clear? Did you get it?**

Do you understand what the author was trying to tell you?

Clarity : Rate 1-10

What is a Sandstorm?

Sandstorms are sometimes called dust storms. They are huge, swirling clouds made of sand or dust which has been picked up and carried along by strong winds. They block out the sun for a time. After one of these storms, sand or dust can be found in every little nook and cranny of houses, cars and machines.



These sandstorms occur in hot, dry parts of the world, especially in deserts. They are common in the Middle East, northern Africa, central China and some parts of America. In these places, the ground becomes so hot that it superheats the air above it. The hot air rises (as it always does) and cooler air rushes in to replace it. All this movement makes the air **unstable**.

Strong winds blow above the hot, dry surface of the land. These winds whip up loose sand or soil and drive it along. A sandstorm has begun! The more sand it picks up, the higher the clouds grow. They look like solid walls on the move and can be as high as 1500 metres. They are able to completely cover towns and cities, shutting out the light of day.

Sandstorms can be dangerous. For example, it is not a good idea to drive a car in a sandstorm as you cannot see where you are going. Also, roads can be totally covered by sand so that you cannot tell where to drive. It can be very difficult to travel anywhere in a sandstorm!

Having sand or dust in the air makes it hard for people to breathe. It can make them cough and choke. In a sandstorm, it is a good idea to wear a mask or to place a cloth over your nose and mouth in order to filter the air you breathe. Goggles for your eyes are also a good idea!

Satellite pictures have shown sandstorms moving over enormous areas of land. The sand or dust will often keep drifting long after the wind has died down. And sandstorms don't just happen here: they have also been seen on the planet Mars!

GLOSSARY

unstable - not firm, solid, or fixed. Likely to change.

satellite - an object put into space which can take pictures of what is happening on the surface of the earth.

Headings and Trigger Words

Use this column to write down a heading and trigger words to summarise each paragraph - **SharpReading Stage 5B**

What is a Sandstorm?

Set 2:4 Activities



REMEMBERING - What are the facts

1. What is another name for a sandstorm?
2. How high can a sandstorm be?
3. Write 2 questions like the ones above. You must be able to find the answers in the explanation.

UNDERSTANDING - Show that you understand the information

4. Draw a picture to show you understand what it would be like in the middle of a sandstorm. You could use this drawing in your infographic (Activity 8).
Include labels to explain what is happening in your drawing.
5. Choose one paragraph from the article. Decide on a heading for that paragraph. Write down some 'trigger words' (words that trigger the information in your head). Use the heading and trigger words to rewrite the paragraph in your own words without going back to the original text.

APPLYING - Using the information in another way

6. **Poetry**
Write a poem or a rap song about cleaning up after a sandstorm - sand everywhere!!!
7. **Newsflash**
Write a newspaper report about a monster sandstorm that hits your town and the damage it does.

ANALYSING - Using an infographic to tell the story

8. Create a fun INFOGRAPHIC to explain all the information you have read about sandstorms.
An infographic is a combination of pictures, diagrams, symbols, flow charts, words and numbers to show information in a fun and interesting way.

CREATING - Coming up with new ideas

9. Design some equipment which would help you to see and breathe in a sandstorm.
Remember to include diagrams, labels, and descriptions to explain your interesting ideas.

EVALUATING - How good is this explanation

10. Do you think this explanation was well written?
Give a reason for each of your ratings.

♦ **Was there an introduction?**

Did the first paragraph tell you what the explanation was going to be about?

♦ **Were the ideas set out in paragraphs?**

Could you see how the author went from one idea to the next?

♦ **Did the author wrap-up the explanation**

Did the author make a summary of the topic at the end?

♦ **Was the information interesting?**

Did you stay interested from the beginning to the end?

♦ **Was the explanation clear? Did you get it?**

Do you understand what the author was trying to tell you?

Introduction : Rate 1-10

Organisation : Rate 1-10

Conclusion : Rate 1-10

Writing style : Rate 1-10

Clarity : Rate 1-10

What are Hurricanes?

Hurricanes are huge tropical storms. They are also known as **typhoons**. They do not happen very often. When they do, they cause a lot of damage especially when they hit land.



Hurricanes only happen in warmer parts of the world. They form over warm oceans of 30°C or more near the equator. Water **evaporates** easily from the warm ocean and rises quickly as water vapour. As it hits cooler air higher up it **condenses** to form droplets of rain in storm clouds.

When heat moves quickly like this from the surface into the atmosphere it creates a spinning pattern around the centre of the storm clouds, very similar to what you see happening when water goes down the plug hole in the bath. Strong winds drive the storm clouds over the sea, sucking up more of the warm moist air from the surface. This increases the speed and sucking power of the storm and increases the size of the storm clouds. Once the wind speed reaches 120 kilometres per hour, the storm is now called a hurricane.

The turning earth also helps to create this spinning pattern to the winds. In the northern **hemisphere**, hurricane winds turn **anticlockwise**. In the southern hemisphere, they turn in a **clockwise** direction.

As it gains strength, the hurricane now spins in a wider and wider circle around a central area called an 'eye'. The eye may be 50 or 60 kilometres wide. Strangely enough in the eye of a hurricane, the weather is calm and fine. But of course, outside the eye, the huge clouds create heavy rain and the spinning results in high winds.

It is when hurricanes reach land that they cause the most damage. The greatest dangers are winds and floods. Wind speeds can reach an astonishing 240 kilometres an hour, smashing over houses and trees. Extremely high tides called **storm surges** are caused by the hurricane. The sea may be six or seven metres higher than normal and can flood inland, especially if the coast is low lying. And remember it is raining heavily as well!

It can take as long as 18 hours for a hurricane to pass over a particular place. Once the huge rotating weather system hits land it starts to weaken because there is no more moist air to fuel it, but it can still take a week to die out completely.

GLOSSARY

evaporation - when something is changed from a liquid to a vapour or gas.

condensation - when something is changed from a gas back to a liquid.

hemisphere - half of a ball shape like the earth.

anticlockwise - in the opposite direction that the hands of a clock move.

clockwise - in the same direction that the hands of a clock move.

storm surges - where the spinning hurricane pushes a wall of water in front of it.

Headings and Trigger Words

Use this column to write down a heading and trigger words to summarise each paragraph - **SharpReading Stage 5B**

What are Hurricanes?

Set 3:1 Activities



REMEMBERING - What are the facts

1. What must there already be before a hurricane can form?
2. When does a storm become a hurricane?
3. Write 2 questions like the ones above. You must be able to find the answers in the explanation.

UNDERSTANDING - Show that you understand the information

4. Draw a diagram to show the difference between a hurricane in the northern hemisphere and a southern hemisphere hurricane. You could use this diagram in your infographic (Activity 8).
Include labels to explain what is happening in your diagram.
5. Choose one paragraph from the explanation. Decide on a heading for that paragraph. Write down some 'trigger words' (words that trigger the information in your head). Use the heading and trigger words to rewrite the paragraph in your own words without going back to the original text.

APPLYING - Using the information in another way

6. **Poetry**
Write a poem or a rap song about the eye of a hurricane.
7. **Picture Book**
Write a story for a 5 year old about Harry Hurricane, a very bad-mooded storm that feeds on warm moist air out at sea and then charges across the land.

ANALYSING - Using an infographic to tell the story

8. Create a fun INFOGRAPHIC to explain all the information you now have read about hurricanes.
An infographic is a combination of pictures, diagrams, symbols, flow charts, words and numbers to show information in a fun and interesting way.

CREATING - Coming up with new ideas

9. Design a house that could stand up to a 240 kilometre an hour hurricane.
Remember to include diagrams, labels, and descriptions to explain your interesting ideas.

EVALUATING - How good is this explanation

10. A well written explanation should start with a clear description of the topic, the ideas should be organised in a clear sequence, it should have a conclusion which wraps-up what has been said at the end, and the information should be written in a way that holds your interest.

AND ... you must be able to understand what the author was trying to explain!!

Do you think this explanation was well written? Give a reason for each of your ratings.

♦ **How good was the introduction?**

Did you get hooked in by the first paragraph? How did the author do that? Humour, imagery?
Did the author make it clear to you what this explanation was going to be about? How?

Introduction : Rate 1-10

♦ **Were the ideas organised in a sequence or steps?**

Did the paragraphs flow from one idea to the next?
Did the author use words like 'first', 'then', 'next' to help with this?

Organisation : Rate 1-10

♦ **How well did the author wrap-up the explanation**

Was there a summarising statement - an attempt to summarise the information in 1 or 2 sentences?
Was there a reflective statement - a personal comment from the author about the topic?

Conclusion : Rate 1-10

♦ **Was the information written in an interesting way?**

What kept you interested? Was it anything to do with the way the author presented the information?
Did the author makes comparisons or uses imagery (similes and metaphors) to help explain the technical ideas?

Writing style : Rate 1-10

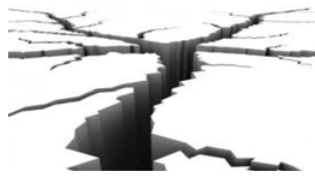
♦ **Was the explanation clear? Did you get it?**

Do you understand what the author was trying to explain? Are there some bits that you still don't get?

Clarity : Rate 1-10

Why Do Earthquakes Happen?

Earthquakes are a natural way that the earth releases built-up pressure. The ground shudders and shakes because underground, the **tectonic plates** are moving and adjusting.



Tectonic plates are huge pieces of rock that form a kind of patchy skin on the earth's crust. They move very slowly but from time to time they clash, get jammed, or judder past each other. When this sort of thing happens, it is likely that an earthquake will result. Most earthquakes occur at the edges of these moving plates.

The place underground where the plates collide is called the **hypercentre** of the earthquake. Shock waves vibrate outwards from this point like ripples on a pond. These are what we feel and call earthquakes. The place where they reach the surface, directly above the hypercentre is called the **epicentre**. This is where the most earthquake damage occurs. Depending on the size the earthquake, cracks may open in the earth. It may trigger **landslides** or **liquefaction**. It may topple buildings.

Can scientists predict earthquakes? No! They happen very suddenly. Sometimes there are small shakes before a big one but there is no way of knowing if there will be a big one after a small one. The main earthquake is followed by **after-shocks** which can continue for weeks, months or years.

Although earthquakes cannot be predicted, they can be measured. The scientists who study earthquakes use both the **Richter scale** and the **Mercalli scale** for this. The Richter scale measures the amount of energy in a quake (1 means a slight shake and over 9 a devastating event). The Mercalli scale measures how destructive it is in the place that it occurs (1 is hardly noticeable and 12 is absolutely destroyed). Despite not being able to predict earthquakes, people can still be prepared for them. We should know what to do and have some emergency supplies stored ready.

Earthquakes happen continually all over the world. Some scientists have estimated that about a million of them happen every year. Many are not even noticed and just a few of them cause damage. Most of them will last less than a minute. Interestingly, more earthquakes happen under the sea than under land.

Earthquakes are just a part of life on planet earth. They can happen at any time and in any kind of weather because their beginnings are below the earth's surface among the shifting masses of rock.

GLOSSARY

tectonic plates - pieces of the earth's crust that sit alongside each other and move against each other when pressure builds up.

hypercentre - the place underground where the plates collide.

liquefaction - during an earthquake the soil can lose its strength causing it to behave like a liquid.

aftershock - smaller earthquakes that come after the first big one.

Headings and Trigger Words

Use this column to write down a heading and trigger words to summarise each paragraph - **SharpReading Stage 5B**

Why Do Earthquakes Happen?

Set 3:2 Activities

REMEMBERING - What are the facts

1. What is the hypercentre of an earthquake?
2. What is the epicenter of an earthquake?
3. Write 2 questions like the ones above. You must be able to find the answers in the explanation.



UNDERSTANDING - Show that you understand the information

4. Draw a picture of some buildings and show what would happen to them in a Richter Scale 3 earthquake. Now draw another picture showing what would happen to them in a Richter Scale 10 earthquake. You could use these drawings in your infographic (Activity 8).

Include labels to explain what is happening in your drawing.

5. Choose one paragraph from the explanation. Decide on a heading for that paragraph. Write down some 'trigger words' (words that trigger the information in your head). Use the heading and trigger words to rewrite the paragraph in your own words without going back to the original text.

APPLYING - Using the information in another way

6. **Poetry**
Write a poem or a rap song about an earthquake that shakes and shakes your house.
7. **Newsflash**
Five days after a building collapses in an earthquake, a small dog is found alive in the rubble. Tell the story in a newspaper report.

ANALYSING - Using an infographic to tell the story

8. Create a fun INFOGRAPHIC to explain all the information you have read about earthquakes.

An infographic is a combination of pictures, diagrams, symbols, flow charts, words and numbers to show information in a fun and interesting way.

CREATING - Coming up with new ideas

9. Design an earthquake emergency pack - everything you would need to help you survive after a huge earthquake. Give reasons for the items you have chosen.

Remember to include diagrams, labels, and descriptions to explain your interesting ideas.

EVALUATING - How good is this explanation

10. A well written explanation should start with a clear description of the topic, the ideas should be organised in a clear sequence, it should have a conclusion which wraps-up what has been said at the end, and the information should be written in a way that holds your interest.

AND ... you must be able to understand what the author was trying to explain!!

Do you think this explanation was well written? Give a reason for each of your ratings.

♦ **How good was the introduction?**

Did you get hooked in by the first paragraph? How did the author do that? Humour, imagery?
Did the author make it clear to you what this explanation was going to be about? How?

Introduction : Rate 1-10

♦ **Were the ideas organised in a sequence or steps?**

Did the paragraphs flow from one idea to the next?
Did the author use words like 'first', 'then', 'next' to help with this?

Organisation : Rate 1-10

♦ **How well did the author wrap-up the explanation**

Was there a summarising statement - an attempt to summarise the information in 1 or 2 sentences?
Was there a reflective statement - a personal comment from the author about the topic?

Conclusion : Rate 1-10

♦ **Was the information written in an interesting way?**

What kept you interested? Was it anything to do with the way the author presented the information?
Did the author make comparisons or uses imagery (similes and metaphors) to help explain the technical ideas?

Writing style : Rate 1-10

♦ **Was the explanation clear? Did you get it?**

Do you understand what the author was trying to explain? Are there some bits that you still don't get?

Clarity : Rate 1-10

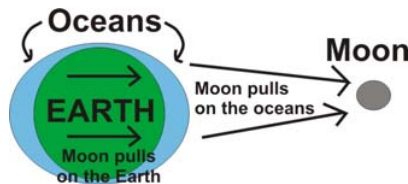
What Causes the Tides?

Tides are caused by the moon. The sun also has a small influence on tides. Does that surprise you?

I love going to the beach to swim, make sandcastles, read a good book or have a picnic. But these fun things can be interrupted by the tide coming in. Waves can wash out your beautiful sand creations. Your legs and towel can be suddenly wet while you are deep in an interesting book. You may have to quickly move your picnic blanket and food further up the beach to escape the waves that seem to be chasing you. All this is caused by the moon? Yes!

The earth and the moon are like **magnets** attracting each other. Although they do not zoom towards each other like magnets, the oceans **bulge** out slightly towards the moon. The side of the earth that is facing the moon has this bulge. It creates a high tide.

There is also a bulge of water on the side of the earth opposite the moon. This is because the earth is also being pulled slightly towards the moon and the water on the side of the earth furthest from the moon is being left behind. This also creates a high tide.



All around the world, the sea is constantly changing from high tide to low tide. Because the earth is turning, the areas of water being pulled by the moon are changing all the time. The moon moves around the earth too, so it is in a different place each day. Every day, at any beach, there are two high tides and two low tides. It takes about 6 hours to change from low to high tide. In 6 more hours, it is low tide again.

Tide times change by approximately one hour a day. If high tide is at 1 o'clock on Monday, it will be at about 2 o'clock on Tuesday. On Wednesday, it will be at about 3 o'clock – and so on.

The sun affects tides when the earth, moon and sun line up, adding the sun's pull to the moon's. This causes stronger or more extreme tides, known as **spring tides**.

It is as though the earth, the moon and the sun are moving in a huge, well-timed dance. The little adventures we have with tides at the beach are the result of the enormous forces that they exert on one another.

GLOSSARY

magnet - a piece of metal that pulls other metal objects towards it.

bulge - to swell or expand.

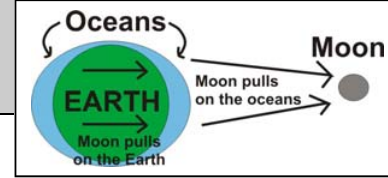
spring tide - a full tide that happens at the same time as the new moon and the full moon which makes the tide higher than it would normally be.

Headings and Trigger Words

Use this column to write down a heading and trigger words to summarise each paragraph - **SharpReading Stage 5B**

What Causes the Tides?

Set 3:3 Activities



REMEMBERING - What are the facts

1. What is the main thing that causes tides?
2. What is the time difference in the high tide each day?
3. Write 2 questions like the ones above. You must be able to find the answers in the explanation.

UNDERSTANDING - Show that you understand the information

4. Draw a diagram to show that you understand what is happening when there is a spring tide. You could use this drawing in your infographic (Activity 8).
Include labels to explain what is happening in your drawing.
5. Choose one paragraph from the explanation. Decide on a heading for that paragraph. Write down some 'trigger words' (words that trigger the information in your head). Use the heading and trigger words to rewrite the paragraph in your own words without going back to the original text.

APPLYING - Using the information in another way

6. **Poetry**
Write a poem or a rap song about the way the moon tugs away at the ocean trying to pull it off the earth.
7. **A Day in the Life of a Beach**
You are a beach. Describe what your day is like as the tide keeps coming in and then going out. What does it wash up on you and how does it make you feel?

ANALYSING - Using an infographic to tell the story

8. Create a fun INFOGRAPHIC to explain all the information you have read about tides.
An infographic is a combination of pictures, diagrams, symbols, flow charts, words and numbers to show information in a fun and interesting way.

CREATING - Coming up with new ideas

9. Design some equipment you could use on the beach that would warn you when the tide is coming in while you are sunbathing.
Remember to include diagrams, labels, and descriptions to explain your interesting ideas.

EVALUATING - How good is this explanation

10. A well written explanation should start with a clear description of the topic, the ideas should be organised in a clear sequence, it should have a conclusion which wraps-up what has been said at the end, and the information should be written in a way that holds your interest.
AND ... you must be able to understand what the author was trying to explain!!
Do you think this explanation was well written? Give a reason for each of your ratings.

◆ **How good was the introduction?**

Did you get hooked in by the first paragraph? How did the author do that? Humour, imagery?
Did the author make it clear to you what this explanation was going to be about? How?

Introduction : Rate 1-10

◆ **Were the ideas organised in a sequence or steps?**

Did the paragraphs flow from one idea to the next?
Did the author use words like 'first', 'then', 'next' to help with this?

Organisation : Rate 1-10

◆ **How well did the author wrap-up the explanation**

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Conclusion : Rate 1-10

◆ **Was the information written in an interesting way?**

What kept you interested? Was it anything to do with the way the author presented the information?
Did the author makes comparisons or uses imagery (similes and metaphors) to help explain the technical ideas?

Writing style : Rate 1-10

◆ **Was the explanation clear? Did you get it?**

Do you understand what the author was trying to explain? Are there some bits that you still don't get?

Clarity : Rate 1-10

What is at the Bottom of the Sea?

At the bottom of the sea there are plains, mountains and valleys very much like the land above water. There is even volcanic activity under the sea! There are also many forms of life. The deeper down you go, the stranger the sea life is.

However, only three percent of the sea floor has ever been mapped. Deep down in the Pacific Ocean is the lowest point on the surface of the earth. It is found in a place called the Mariana Trench, to the east of the Mariana Islands and is eleven kilometres deep. It is so deep that if you put Mount Everest down there, its top would be almost two kilometres below the surface of the sea. In these very deep areas of the ocean, the water is very, very cold and its weight is immense. The only way people can go there and survive is in especially made underwater craft.

Down in these deep areas, there are natural **volcanic chimneys**. They stick up from the sea floor and spew out superhot bubbling black gas and water. That is why they are called 'black smokers'. They heat up the sea water and help some forms of life to survive there.

Of course it is totally dark down there, so far away from the light of the sun. Strange and unusual kinds of sea life have been glimpsed with the artificial light of the few exploring craft which have ventured there. For example, there is the Dumbo Octopus, so named because it has fins that look like large, floppy ears. There are creatures that sparkle like fireworks as they swim through the dark. There are also giant worms, blind shrimps and some sparse plant life.

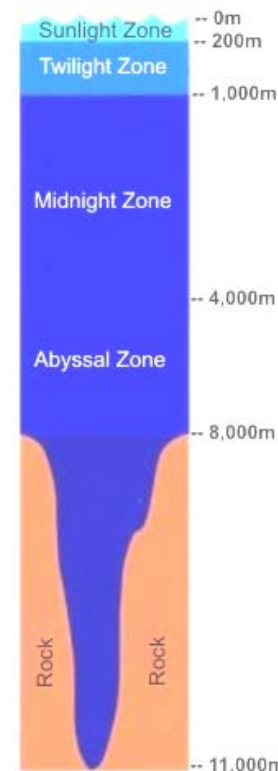
Some people think that the Mariana Trench is the ideal place to dump nuclear waste. It is so far away that they think it would be safe. Others are horrified at this thought. It could poison the unique deep sea life or even leak below the earth's crust. Actually, it is against international law to dump nuclear waste in the ocean.

The bottom of the ocean is one of the last mysteries for us here on earth. It is a vast, mostly unknown area that is almost as hard to explore as another planet. We are still finding out what is at the bottom of the sea.

GLOSSARY

volcanic chimney - a vertical channel like a pipe that pokes up from the seabed and releases lava and hot gas from deeper down in the earth's core below the sea.

The Mariana Trench



Headings and Trigger Words

Use this column to write down a heading and trigger words to summarise each paragraph - **SharpReading Stage 5B**

What is at the Bottom of the Sea?

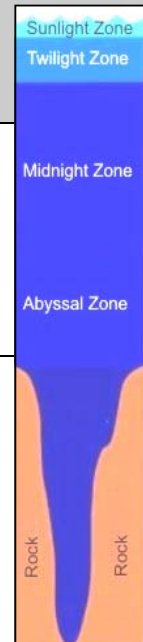
Set 3:4 Activities

REMEMBERING - What are the facts

1. How much of the sea floor has been mapped?
2. What comes out of a natural volcanic chimney?
3. Write 2 questions like the ones above. You must be able to find the answers in the explanation.

UNDERSTANDING - Show that you understand the information

4. Draw a picture of what you think the Dumbo Octopus looks like from the description given in the explanation. You could use this drawing in your infographic (Activity 8).
Include labels to explain what is happening in your drawing.
5. Choose one paragraph from the explanation. Decide on a heading for that paragraph. Write down some 'trigger words' (words that trigger the information in your head). Use the heading and trigger words to rewrite the paragraph in your own words without going back to the original text.



APPLYING - Using the information in another way

6. **Poetry**
Write a poem or a rap about the creepy creatures you might find at the bottom of the sea.
7. **Adventure Story**
Write a short story about the first ever trip to the bottom of the Mariana Trench in a special submarine. Will the submarine stand up to the pressure? What is really down there?

ANALYSING - Using an infographic to tell the story

8. Create a fun INFOGRAPHIC to explain all the information you have read about the what is going on at the bottom of the sea.
An infographic is a combination of pictures, diagrams, symbols, flow charts, words and numbers to show information in a fun and interesting way.

CREATING - Coming up with new ideas

9. Design an underwater city for the Mariana Trench. Show how you would overcome the problems of water pressure at that depth, no light, getting to the city and back to the surface. Include an advertisement to attract people to come and live in your new city. What are the advantages of living underwater?
Remember to include diagrams, labels, and descriptions to explain your interesting ideas.

EVALUATING - How good is this explanation

10. A well written explanation should start with a clear description of the topic, the ideas should be organised in a clear sequence, it should have a conclusion which wraps-up what has been said at the end, and the information should be written in a way that holds your interest.

AND ... you must be able to understand what the author was trying to explain!!

Do you think this explanation was well written? Give a reason for each of your ratings.

♦ **How good was the introduction?**

Did you get hooked in by the first paragraph? How did the author do that? Humour, imagery?
Did the author make it clear to you what this explanation was going to be about? How?

Introduction : Rate 1-10

♦ **Were the ideas organised in a sequence or steps?**

Did the paragraphs flow from one idea to the next?
Did the author use words like 'first', 'then', 'next' to help with this?

Organisation : Rate 1-10

♦ **How well did the author wrap-up the explanation**

Was there a summarising statement - an attempt to summarise the information in 1 or 2 sentences?
Was there a reflective statement - a personal comment from the author about the topic?

Conclusion : Rate 1-10

♦ **Was the information written in an interesting way?**

What kept you interested? Was it anything to do with the way the author presented the information?
Did the author makes comparisons or uses imagery (similes and metaphors) to help explain the technical ideas?

Writing style : Rate 1-10

♦ **Was the explanation clear? Did you get it?**

Do you understand what the author was trying to explain? Are there some bits that you still don't get?

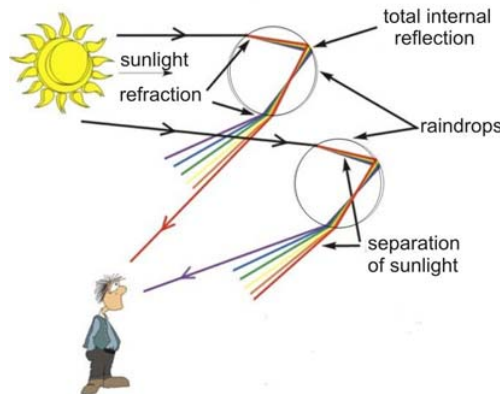
Clarity : Rate 1-10

What Causes Rainbows?

A rainbow is not a physical object. It is a human optical perception of an interaction between sunlight and water drops in the sky. It appears to the human eye as an arc composed of coloured bands of light.

To see a rainbow you must be standing with your back to the sun while it is low in the sky. Therefore, early morning and late afternoon are likely times for rainbows to appear. Also, rain must be falling in the distance ahead of you.

Raindrops act as light **reflectors**. When white sunlight hits them and enters them, their dense watery nature changes the angle of the travelling light. As it reflects off the curved inside surface of the raindrop, it is bent slightly before it exits the raindrop.



White sunlight is made up of different **wavelengths**. These various wavelengths correspond to various colours seen by the human eye. The shortest wavelength is seen as red and the longest wavelength is seen as violet. As the wavelengths exit a raindrop, they exit as the different colours of the rainbow, according to their length: red, orange, yellow, green, blue, indigo, violet. That is why the colours of the rainbow are always in the same order.

This separation of white sunlight into its spectrum of colours is called **refraction**. Sunlight shining on millions of raindrops and being refracted causes a vibrant rainbow.

Sometimes it is possible to see what is known as a double rainbow, or secondary rainbow, which appears outside the main rainbow. This occurs if the light is reflected twice within a rain drop, off two walls of its inner surface. However, the secondary rainbow reverses the order in which the colours appear. Therefore, the 'top' of the primary rainbow is red and the 'bottom' of the secondary rainbow is red.

A rainbow is a beautiful sight which can be admired but never approached because it only exists as an alignment of sun, rain and the human eye.

GLOSSARY

reflector - an object, usually glass, plastic or metal, that reflects or bounces back light waves so that an image can be seen.

wavelength - the distance between the peaks (the top) or the troughs (the bottom) of two consecutive (or following) waves.

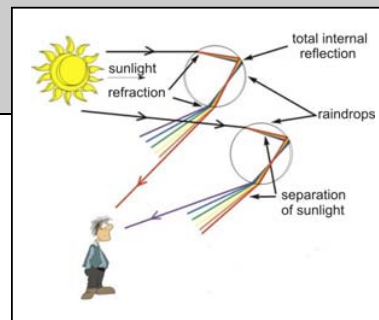
refraction - the change in direction that occurs when a wave of light passes from one medium (air) to a more dense medium (water). The wave is 'bent'.

Headings and Trigger Words

Use this column to write down a heading and trigger words to summarise each paragraph - **SharpReading Stage 5B**

What Causes Rainbows?

Set 4:1 Activities



REMEMBERING - What are the facts

1. When are you most likely to see a rainbow?
2. What is different about a secondary rainbow?
3. Write 2 questions like the ones above. You must be able to find the answers in the explanation.

UNDERSTANDING - Show that you understand the information

4. Draw pictures or diagrams to show the 3 things that need to happen for you to be able to see a rainbow. You could use this drawing in your infographic (Activity 8).
Include labels to explain what is happening in your drawing.
5. Choose one paragraph from the explanation. Decide on a heading for that paragraph. Write down some 'trigger words' (words that trigger the information in your head). Use the heading and trigger words to rewrite the paragraph in your own words without going back to the original text.

APPLYING - Using the information in another way

6. **Poetry**
Write a poem or a rap about light waves that get bent and refracted and split up.
7. **Adventure Story**
Write a short story about some kids who set off to find the pot of gold at the end of the rainbow and what they DO find.

ANALYSING - Using an infographic to tell the story

8. Create an INFOGRAPHIC to explain all the information you now have read about rainbows.
An infographic is a combination of pictures, diagrams, symbols, flow charts, words and numbers to show information in a fun and interesting way.

CREATING - Coming up with new ideas

9. Now that you understand how rainbows are formed invent a machine that could create rainbows in malls or for window displays OR come up with another use for 'artificial' rainbows.
Remember to include diagrams, labels, and descriptions to explain your interesting ideas.

EVALUATING - How good is this explanation

10. A well written explanation should start with a clear description of the topic, the ideas should be organised in a clear sequence, it should have a conclusion which wraps-up what has been said at the end, and the information should be written in a way that holds your interest.

AND ... you must be able to understand what the author was trying to explain!!

Do you think this explanation was well written? Give a reason for each of your ratings.

◆ **How good was the introduction?**

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Did the author make it clear to you what this explanation was going to be about? How?

Introduction : Rate 1-10

◆ **Were the ideas organised in a sequence or steps?**

Did the paragraphs flow from one idea to the next?
Did the author use words like 'first', 'then', 'next' to help with this?

Organisation : Rate 1-10

◆ **How well did the author wrap-up the explanation**

Was there a summarising statement - an attempt to summarise the information in 1 or 2 sentences?
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Conclusion : Rate 1-10

◆ **Was the information written in an interesting way?**

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Writing style : Rate 1-10

◆ **Was the explanation clear? Did you get it?**

Do you understand what the author was trying to explain? Are there some bits that you still don't get?

Clarity : Rate 1-10

How Do Volcanoes Work?

Volcanoes provide some of the most dramatic and dangerous displays in nature. They are like a natural fireworks show! They occur in places where **tectonic plates** (enormous pieces of rock that make up the Earth's surface) are moving. The plates, either pulling apart or pushing together, create **vents** and hot molten rocks burst up through the Earth's crust from deep within our planet.



The vents or cracks in the earth's surface that allow volcanic matter to spew out of them are the beginning of volcanic mountains. These mountains form slowly over time. We often think of volcanic mountains as typical cone shapes, such as Mount Fuji in Japan. These sorts of volcanoes are known as **strato** or **composite volcanoes**. As a result of many **eruptions**, they build up into the cone shape with layers of cinders, ash and lava. They are, though, only one type of volcanic mountain.

Another type is a **lava dome** where the dome shape of the mountain is built up gradually from slow eruptions of thick **magma** (molten rock beneath the surface). This slow-moving **lava** (molten rock after it flows out of the volcano) does not flow far before it hardens. As a result, the mountain becomes a steep-sided mound.

A third type of volcanic mountain is a **shield volcano** which is very broad with long, gentle slopes. It forms this way because its lava is runny and flows freely, travelling a good distance before it hardens. It gets its name because from a distance it looks like a shield resting on the ground.

Do you imagine that volcanic activity goes on under the sea? Submarine volcanoes are actually quite common. Those that are in deep water are not as noticeable as those that are in shallow water. The ones in shallow water can blast steam and rocks high above the sea's surface. Those in deep water form new sea floors as the hot molten rock cools and solidifies. Over time, underwater volcanoes may become large enough to create new islands.

Volcanic eruptions can cause loss of life and lots of damage to property. Therefore, scientists study them to understand the warning signs of volcanic activity. They have learnt that magma gathers in the **magma chamber** (an area beneath a volcanic mountain) before an eruption. As the pressure grows, gases are released. The increase of **sulphur dioxide** in these gases can be measured as the chance of an eruption increases. There also tends to be an increase of small earthquakes before an eruption. Although houses and buildings cannot be saved, people can be evacuated to safety if an eruption is likely.

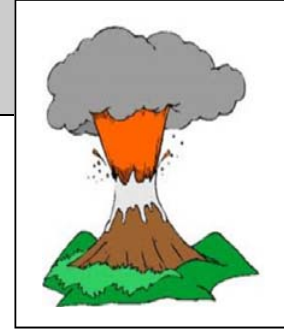
Tectonic plates will continue to move and volcanoes will continue to erupt as the earth undergoes its never ending changes.

Headings and Trigger Words

Use this column to write down a heading and trigger words to summarise each paragraph - **SharpReading Stage 5B**

How Do Volcanoes Work?

Set 4:2 Activities



REMEMBERING - What are the facts

1. What are volcano vents?
2. What is a submarine volcano?
3. Write 2 questions like the ones above. You must be able to find the answers in the explanation.

UNDERSTANDING - Show that you understand the information

4. Draw a picture to show you understand the difference between the 3 different types of volcano mentioned in the explanation. You could use this drawing in your infographic (Activity 8).
Include labels to explain what is happening in your drawings.
5. Choose one paragraph from the explanation. Decide on a heading for that paragraph. Write down some 'trigger words' (words that trigger the information in your head). Use the heading and trigger words to rewrite the paragraph in your own words without going back to the original text.

APPLYING - Using the information in another way

6. **Poetry**
Write a poem or a rap song about a volcano blowing it's top!
7. **Picture Book**
Make a short picture book for a 5 year old about Vinnie Volcano, a little volcano that wants to make his mark on the world.

ANALYSING - Using an infographic to tell the story

8. Create a fun INFOGRAPHIC to explain all the information you have read about volcanoes.
An infographic is a combination of pictures, diagrams, symbols, flow charts, words and numbers to show information in a fun and interesting way.

CREATING - Coming up with new ideas

9. You live on the side of a volcanic mountain. Design a special house that could survive a lava flow if the volcano ever erupted.
Remember to include diagrams, labels, and descriptions to explain your interesting ideas.

EVALUATING - How good is this explanation

10. A well written explanation should start with a clear description of the topic, the ideas should be organised in a clear sequence, it should have a conclusion which wraps-up what has been said at the end, and the information should be written in a way that holds your interest.
AND ... you must be able to understand what the author was trying to explain!!

Do you think this explanation was well written? Give a reason for each of your ratings.

♦ **How good was the introduction?**

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Did the author make it clear to you what this explanation was going to be about? How?

Introduction : Rate 1-10

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Organisation : Rate 1-10

♦ **How well did the author wrap-up the explanation**

Was there a summarising statement - an attempt to summarise the information in 1 or 2 sentences?
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Conclusion : Rate 1-10

♦ **Was the information written in an interesting way?**

What kept you interested? Was it anything to do with the way the author presented the information?
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Writing style : Rate 1-10

♦ **Was the explanation clear? Did you get it?**

Do you understand what the author was trying to explain? Are there some bits that you still don't get?

Clarity : Rate 1-10

How Do Waterspouts Form?

Have you ever seen a waterspout? It is similar to a tornado but only occurs over water. It is a whirling pillar of wet air that looks like the stalk of a gigantic mushroom connecting the surface of the water to a cloud, or like a magical beanstalk reaching up into the sky.



There are two kinds of waterspout: **tornadic** and **non-tornadic**. They take place in different weather conditions and are formed differently. The most common ones are non-tornadic or fair weather waterspouts. They start forming on the surface of the water and move upwards towards a low cloud. They are not as dangerous as tornadic ones. Tornadic waterspouts are associated with bad weather. They descend downwards from the clouds during a thunderstorm and are the terrible twin of the tornado. They have been known to suck up shoals of fish. This explanation looks at the more friendly non-tornadic waterspouts.

Conditions must be just right for the formation of these fair weather waterspouts. Firstly, temperatures must be warm and humid, which is the reason that many waterspouts occur in the tropics. Secondly, there must be some wind or movement of rising air. Also, there must be those puffy cotton wool cumulous clouds above. Waterspouts form best where these clouds have a flat, dark base which usually means that rain is not far away. If conditions are just right several waterspouts may form under the same bank of clouds.

There are five recognised stages in the formation of a waterspout. The first stage is seen as a dark, circular area on the surface of the water. This is caused by warm air above the water rising and beginning to move in a circle.

In the second stage, a spiral pattern can be seen on the water. As the warm air rises, cooler air rushes in horizontally to replace it, causing the air to spin. This rotating wind continues to increase. As the humid air rises, it forms the tiny water drops that make up clouds. It meets the cloud above, which is heavy with moisture. This begins the funnel shape of a typical waterspout.

The third stage sees a ring of spray on the surface of the water and a turbulent mist swirling around.

Fourthly, the whole waterspout can be seen. It looks like a solid shape but is really a thin cloud of tiny water drops. It is actually almost transparent.

In the final stage, the whirling funnel weakens, often when the cloud above it begins to rain. This cools the warm air feeding the waterspout and it ends. Most waterspouts last only about five or ten minutes although large ones have been known to continue for up to an hour.

Headings and Trigger Words

Use this column to write down a heading and trigger words to summarise each paragraph - **SharpReading Stage 5B**

How Do Waterspouts Form?

Set 4:3 Activities



REMEMBERING - What are the facts

1. Why are non-tornadic waterspouts called 'fair-weather' waterspouts?
2. What is the difference between a tornadic and a non-tornadic waterspout?
3. Write 2 questions like the ones above. You must be able to find the answers in the explanation.

UNDERSTANDING - Show that you understand the information

4. Draw pictures or diagrams to show the 3 things that are needed for waterspouts to form. You could use this drawing in your infographic (Activity 8).
Include labels to explain what is happening in your drawing.
5. Choose one paragraph from the explanation. Decide on a heading for that paragraph. Write down some 'trigger words' (words that trigger the information in your head). Use the heading and trigger words to rewrite the paragraph in your own words without going back to the original text.

APPLYING - Using the information in another way

6. **Poetry**
Write a poem or a rap song about wispy friendly fair weather waterspouts and their not so friendly cousin the tornadic waterspout.
7. **Newsflash**
Write a newspaper report about a shoal of fish that get sucked up by a waterspout and dropped in a very unusual place.

ANALYSING - Using an infographic to tell the story

8. Create a fun INFOGRAPHIC to explain all the information you now have read about waterspouts.
An infographic is a combination of pictures, diagrams, symbols, flow charts, words and numbers to show information in a fun and interesting way.

CREATING - Coming up with new ideas

9. You live by the sea in an area where fair weather waterspouts form very day. While they don't cause damage they are a nuisance and limit the use of the sea for swimming and boating. Use your knowledge about how they form to solve the problem.
Remember to include diagrams, labels, and descriptions to explain your interesting ideas.

EVALUATING - How good is this explanation

10. A well written explanation should start with a clear description of the topic, the ideas should be organised in a clear sequence, it should have a conclusion which wraps-up what has been said at the end, and the information should be written in a way that holds your interest.

AND ... you must be able to understand what the author was trying to explain!!

Do you think this explanation was well written? Give a reason for each of your ratings.

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Introduction : Rate 1-10

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Organisation : Rate 1-10

♦ **How well did the author wrap-up the explanation**

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Conclusion : Rate 1-10

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Writing style : Rate 1-10

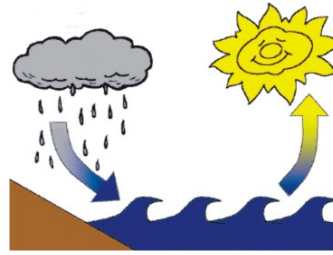
♦ **Was the explanation clear? Did you get it?**

Do you understand what the author was trying to explain? Are there some bits that you still don't get?

Clarity : Rate 1-10

What is the Water Cycle?

A cycle is like a circle. A cycle is a series of events that continually follow one another: for example, the seasons move in a cycle. The water cycle is a never-ending journey in which water travels through four stages.



Although we could start anywhere in the cycle, we will begin with the **precipitation** stage. This is when water falls from the sky as rain, hail, sleet or snow. Precipitation occurs when the amount of water in the clouds has increased to the point that it is too heavy. It falls towards the ground.

The next phase is the **collection** phase. When rain, hail or sleet fall, the water can seep into the ground where it is absorbed by plants or becomes part of deep underground lakes. It can also run into lakes or into rivers which carry it straight to the sea. Snow, however, may stay on top of the ground for much longer before it melts. In very cold climates, snow may stay frozen for thousands of years in glaciers or as part of the world's ice-caps.

What happens next in the cycle is **evaporation** and **transpiration**. In both of these processes, water is taken up into the air. Water evaporates when the heat of the sun causes it to become water vapour. We have all seen steam from a boiling pot disappearing into the air as some of the water becomes vapour. In a similar, although gentler way, the sun's heat causes water to be absorbed into the air. Transpiration is the process by which plants rid themselves of excess water by 'breathing' it out through their leaves. Both evaporation and transpiration change water from a liquid to a gas.

Water vapour, which is invisible, rises up as warm air. However, as it gains height, it begins to cool – and then comes the next stage of the cycle – **condensation**. Condensation is the changing of water vapour back to liquid water. As the air cools, tiny water drops begin to form clouds. These clouds float about until the water becomes too heavy and precipitation takes place.

Obviously, the same water does not go through each stage of the cycle at the same speed. Actually, much more water is in the collection or storage stage than is moving on through the other stages. Apparently, 95% of all water is stored in the oceans of the world!

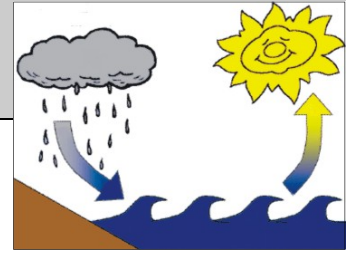
Through the four stages of the water cycle: precipitation, collection, evaporation (and transpiration) and condensation, the balance of water moving about the earth remains reasonably constant. The amount of water in the world remains the same but its forms are constantly changing.

Headings and Trigger Words

Use this column to write down a heading and trigger words to summarise each paragraph - **SharpReading Stage 5B**

What is the Water Cycle?

Set 4:4 Activities



REMEMBERING - What are the facts

1. What is precipitation?
2. When does precipitation occur?
3. Write 2 questions like the ones above. You must be able to find the answers in the explanation.

UNDERSTANDING - Show that you understand the information

4. Draw a picture or a diagram to show you understand what is happening during one of the stages of the water cycle. You could use this drawing in your infographic (Activity 8).
Include labels to explain what is happening in your drawing.
5. Choose one paragraph from the explanation. Decide on a heading for that paragraph. Write down some 'trigger words' (words that trigger the information in your head). Use the heading and trigger words to rewrite the paragraph in your own words without going back to the original text.

APPLYING - Using the information in another way

6. **Poetry**
Write a poem or a rap song about the water cycle words - precipitation, collection, evaporation, transpiration, and condensation.
7. **A Day in the Life of a Drop of Water**
Describe your wild ride adventure as a drop of water in a typical day in the water cycle.

ANALYSING - Using an infographic to tell the story

8. Create a fun INFOGRAPHIC to explain all the information you have read about the water cycle.
An infographic is a combination of pictures, diagrams, symbols, flow charts, words and numbers to show information in a fun and interesting way.

CREATING - Coming up with new ideas

9. You have a small vegetable garden that needs rain every day. Design your own 'water cycle' to make this happen. Show how the water is collected from the soil, how it is heated up and evaporates and how it is cooled down again to form condensation.
Remember to include diagrams, labels, and descriptions to explain your interesting ideas.

EVALUATING - How good is this explanation

10. A well written explanation should start with a clear description of the topic, the ideas should be organised in a clear sequence, it should have a conclusion which wraps-up what has been said at the end, and the information should be written in a way that holds your interest.

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Introduction : Rate 1-10

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Organisation : Rate 1-10

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Conclusion : Rate 1-10

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Writing style : Rate 1-10

◆ **Was the explanation clear? Did you get it?**

Do you understand what the author was trying to explain? Are there some bits that you still don't get?

Clarity : Rate 1-10

Mirages – Are They Real?

According to movies and books, many a dehydrated traveller crawling through the desert has had visions of palm trees and pools of water in the distance, only to find that they disappear when approached. We assume that these visions are the crazed hallucinations of people nearing death. However, this is not true. Mirages can actually be photographed!



They are caused by the **refraction** (bending) of light. Therefore, they are natural phenomena and are actually due to weather conditions. However, the interpretations of such phenomena are often incorrect.

It is not easy to understand refracted light. However, you have probably seen a paint brush standing in a clear glass jar full of water and wondered why, at the surface of the water, the handle of the brush seems to be disconnected from the bristles! This is an example of how light refracts, or bends, when it passes from one medium (air) to another (water). Mirages, on the other hand, occur when light is refracted as it passes from one type of air to another type of air.

The weather conditions necessary for creating mirages are to do with air temperature. If there are two layers of air which are at very different temperatures, the border where they meet is able to refract (bend) light. When light enters warm air from cold air, it bends. Mirages do not just happen in the desert but anywhere that two layers of air possessing distinctly different temperatures meet. They occur frequently in polar regions and over the ocean.

A mirage can be either 'inferior' or 'superior'. This has nothing to do with how good it looks! An **inferior mirage** appears below the real object that it represents. Common inferior mirages are those that are seen along asphalt roads on hot days. It appears as if puddles of liquid are shimmering on the surface. Rays of light coming at a shallow angle from above are refracted as they enter the hot air above the ground. These curved rays do not quite reach the surface of the road. Your eye sees the sky, displaced below where it really is. Your mind interprets it as water.

Superior mirages appear above the object that they represent. Where warm air is above cold air, light rays bend the other way. Your eye follows these rays to see something above where it actually is. For example, a ship may be seen floating in the air above the actual ship (but upside down). Superior mirages can even bring to the eye distant things from around the curve of the earth. For example, the sun may be seen on the horizon after it has already set.

A mirage is not a trick of the mind. Those who see mirages see something real although it is a displaced image. The way their minds interpret what they see may not be true, however. Water in the desert may be the sky and palm trees may be clouds. It is thought that many reports of UFOs may actually be of mirages.

So – are mirages real? Well, yes and no!

Headings and Trigger Words

Use this column to write down a heading and trigger words to summarise each paragraph - **SharpReading Stage 5B**

Mirages - Are They Real?

Set 5:1 Activities



REMEMBERING - What are the facts

1. What is the cause of a mirage?
2. Where do mirages frequently occur?
3. Write 2 questions like the ones above. You must be able to find the answers in the explanation.

UNDERSTANDING - Show that you understand the information

4. Draw a diagram to show you understand what the paint brush looks like in a glass of water (an example of refraction). You could use this drawing in your infographic (Activity 8).
Include labels to explain what is happening in your drawing.
5. Choose one paragraph from the explanation. Decide on a heading for that paragraph. Write down some 'trigger words' (words that trigger the information in your head). Use the heading and trigger words to rewrite the paragraph in your own words without going back to the original text.

APPLYING - Using the information in another way

6. **Poetry**
Write a poem or a rap song about mysterious mirages and the tricks they play on the eyes.
7. **Adventure Story**
You are lost in the desert. What is that you see shimmering on the horizon? Write your own mirage adventure.

ANALYSING - Using an infographic to tell the story

8. Create a fun INFOGRAPHIC to explain all the information you have read about mirages.
An infographic is a combination of pictures, diagrams, symbols, flow charts, words and numbers to show information in a fun and interesting way.

CREATING - Coming up with new ideas

9. Design an apparatus that can tell whether what you see is a mirage or not.
Remember to include diagrams, labels, and descriptions to explain your interesting ideas.

EVALUATING - How good is this explanation

10. A well written explanation should start with a clear description of the topic, the ideas should be organised in a clear sequence, it should have a conclusion which wraps-up what has been said at the end, and the information should be written in a way that holds your interest.

AND ... you must be able to understand what the author was trying to explain!!

Do you think this explanation was well written? Give a reason for each of your ratings.

- | | |
|--|----------------------------------|
| ♦ How good was the introduction?
Did you get hooked in by the first paragraph? How did the author do that? Humour, imagery?
Did the author make it clear to you what this explanation was going to be about? How? | Introduction : Rate 1-10 |
| ♦ Were the ideas organised in a sequence or steps?
Did the paragraphs flow from one idea to the next?
Did the author use words like 'first', 'then', 'next' to help with this? | Organisation : Rate 1-10 |
| ♦ How well did the author wrap-up the explanation
Was there a summarising statement - an attempt to summarise the information in 1 or 2 sentences?
Was there a reflective statement - a personal comment from the author about the topic? | Conclusion : Rate 1-10 |
| ♦ Was the information written in an interesting way?
What kept you interested? Was it anything to do with the way the author presented the information?
Did the author makes comparisons or uses imagery (similes and metaphors) to help explain the technical ideas? | Writing style : Rate 1-10 |
| ♦ Was the explanation clear? Did you get it?
Do you understand what the author was trying to explain? Are there some bits that you still don't get? | Clarity : Rate 1-10 |

What Causes Tsunamis?

A **tsunami** (pronounced 'soon army') is one of the most powerful forces in nature. 'Tsunami' is the Japanese word for the giant waves that start at sea and then crash on to land, resulting in enormous destruction and havoc. In the past, they were known as 'tidal waves' but actually have nothing to do with tides and tidal patterns. They are caused by undersea **geological activity** such as earthquakes, volcanoes or landslides.



It is no co-incidence that the word for these huge, destructive waves is Japanese as so many of them occur around the Japanese coast. Most tsunamis occur somewhere in the Pacific Ocean which is surrounded by the 'Ring of Fire', a circle of active volcanoes where earthquakes are also common. Around the margins of the Pacific, **tectonic plates** are constantly shifting. When they hit together under the sea or jerkily grind past each other, an earthquake occurs and enormous quantities of water are displaced.

At the moment the earthquake happens, sending some parts of the ocean floor upwards and others downwards, the point on the surface of the sea at the **epicentre** rears upwards. However, this hump in the sea's surface then subsides. The tsunami may not even be noticeable until it nears land. But, the huge surges that will become a tsunami have begun racing along the seabed. A tsunami will hit land with a number of waves. This series of waves rushes outwards from the earthquake's epicentre, expanding in all directions. In deep water, the waves are a long way apart and may only show themselves a few feet above the ocean's surface. The vast majority of the wave travels under the surface. These waves move very fast, as fast as a jet plane. They cover 800 kilometres an hour or 8 kilometres per second and travel enormous distances. Did you know that they can cross the entire Pacific Ocean in less than a day?

When a wave surge reaches shallow water such as around a coastline, it slows and grows in height as its base pushes it upwards. It quickly becomes a wall of water, tens of metres high. Those that measure over 40 metres tall are called **megatsunamis**. These walls of water cause widespread destruction when they hit land, inundating coastal regions and levelling buildings. Their force has been known to bend parking metres flat to the ground! They may travel inland several kilometres. The first wave is not always the biggest and successive waves increase the destruction. The series of tsunami waves may continue for some hours.

The best defence for people dwelling on the coast is a good early warning system. Strangely, nature has produced a warning which can save lives, if recognised. Sometimes, a **vacuum effect** occurs because the trough of the tsunami wave reaches shore shortly before the rest. When this happens, coastal water is sucked out to sea exposing the seabed. Coastal inhabitants then have about 5 minutes to escape to higher ground and avoid the incoming destruction.

Tsunamis are natural disasters and cannot be prevented.

Headings and Trigger Words

Use this column to write down a heading and trigger words to summarise each paragraph (SharpReading Stage 5B)

What Causes Tsunamis?

Set 5:2 Activities



REMEMBERING - What are the facts

1. What is another name used to describe this phenomena?
2. Where do most tsunamis occur?
3. Write 2 questions like the ones above. You must be able to find the answers in the explanation.

UNDERSTANDING - Show that you understand the information

4. Draw a diagram to show you understand how a tsunami is triggered (where it all starts)
You could use this drawing in your infographic (Activity 8).
Include labels to explain what is happening in your drawing.
5. Choose one paragraph from the explanation. Decide on a heading for that paragraph.
Write down some 'trigger words' (words that trigger the information in your head).
Use the heading and trigger words to rewrite the paragraph in your own words without going back to the original text.

APPLYING - Using the information in another way

6. **Poetry**
Write a poem or a rap song about the tsunami; the terrible wall of water that sweeps away absolutely everything in its path.
7. **Newsflash**
Write a news report about an old woman who was found on the roof of her house floating 50 kilometers out at sea after a tsunami. Get her story!

ANALYSING - Using an infographic to tell the story

8. Create a fun INFOGRAPHIC to explain all the information you have read about tsunamis.
An infographic is a combination of pictures, diagrams, symbols, flow charts, words and numbers to show information in a fun and interesting way.

CREATING - Coming up with new ideas

9. You are building a house on the beach. Make some modifications to the design so that your house will survive a 3 metre high tsunami.
Remember to include diagrams, labels, and descriptions to explain your interesting ideas.

EVALUATING - How good is this explanation

10. A well written explanation should start with a clear description of the topic, the ideas should be organised in a clear sequence, it should have a conclusion which wraps-up what has been said at the end, and the information should be written in a way that holds your interest.

AND ... you must be able to understand what the author was trying to explain!!

Do you think this explanation was well written? Give a reason for each of your ratings.

♦ **How good was the introduction?**

Did you get hooked in by the first paragraph? How did the author do that? Humour, imagery?
Did the author make it clear to you what this explanation was going to be about? How?

Introduction : Rate 1-10

♦ **Were the ideas organised in a sequence or steps?**

Did the paragraphs flow from one idea to the next?
Did the author use words like 'first', 'then', 'next' to help with this?

Organisation : Rate 1-10

♦ **How well did the author wrap-up the explanation**

Was there a summarising statement - an attempt to summarise the information in 1 or 2 sentences?
Was there a reflective statement - a personal comment from the author about the topic?

Conclusion : Rate 1-10

♦ **Was the information written in an interesting way?**

What kept you interested? Was it anything to do with the way the author presented the information?
Did the author makes comparisons or uses imagery (similes and metaphors) to help explain the technical ideas?

Writing style : Rate 1-10

♦ **Was the explanation clear? Did you get it?**

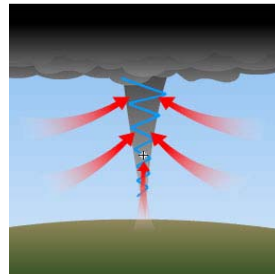
Do you understand what the author was trying to explain? Are there some bits that you still don't get?

Clarity : Rate 1-10

What is A Tornado?

Tornadoes are awesome! They are powerful natural forces that fascinate some people so much that they become storm chasers. However, tornadoes can also be deadly and those who chase them endanger their own lives.

Tornadoes are forceful, spinning pillars of air that reach downwards from thunderstorm clouds. Hanging, snake-like parts of the cloud are known as **funnel clouds** until they hit the ground and then they become a tornado. Some are short-lived and harmless but many of them are very destructive.



Tornadoes are associated with bad weather, thunderstorms, strong winds, large hailstones and often, a dark greenish sky. A tornado is said to sound like a roaring freight train. Conditions must be just right for a tornado to form. There must be a meeting of two air masses. One of these must be warm and moist, the other cool and dry. This meeting of two very different air masses creates an unstable atmosphere and a lot of moving air (wind). The wind may increase in speed and change its direction. It can cause air to spin in a horizontal direction underneath a thundercloud. Then, rising air lifts this horizontally spinning tube of air to an upright position. The area of rotating air may be up to six miles wide. Within this area, it is likely that funnel clouds will form.

Once a funnel cloud hits the ground and becomes a tornado, it may last only 10 minutes and travel only 10 kilometres. On the other hand, it may last several hours, travel 100 kilometres and tear apart everything in its path! Although an average tornado travels at about 50 kilometres an hour, some massive ones reach speeds of over 90 kilometres an hour. In addition, the speed of the wind within tornadoes varies greatly.

The most extreme ones contain winds exceeding 400 kilometres per hour. These are the ones responsible for the destruction of large buildings and homes. Their power can uproot trees, destroy bridges and toss cars into the air. Some have even been known to suck all the water out of riverbeds!

Tornadoes occur in many parts of the world but 75% of them occur in the United States. The main danger area is known as 'Tornado Alley' in the central plains. In this huge area, warm moist air coming from the Gulf of Mexico in the south-east meets cold, dry air coming from the north-west. The most affected states are Texas, Oklahoma, Nebraska and Kansas. (Remember 'The Wizard of Oz'?) Many other states experience tornadoes also. Houses built in these areas have underground cellars where people can shelter if a tornado hits.

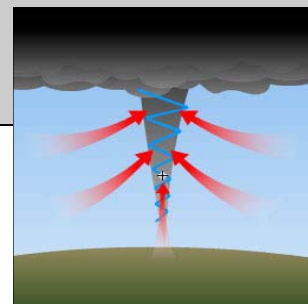
Tornadoes can be beautiful but they are frightening and can be lethal. In the United States alone, they cause 70 or 80 deaths a year! Early detection and warnings by weather forecasters can save lives. Those living in danger areas need to stay aware and have a safety plan.

Headings and Trigger Words

Use this column to write down a heading and trigger words to summarise each paragraph (SharpReading Stage 5B)

What is a Tornado?

Set 5:3 Activities



REMEMBERING - What are the facts

1. What do people say a tornado sounds like?
2. What is the speed of the average tornado?
3. Write 3 questions like the ones above. You must be able to find the answers in the explanation.

UNDERSTANDING - Show that you understand the information

4. Draw a picture or a diagram to show you understand what has to happen for a funnel cloud to become a tornado. You could use this picture in your infographic (Activity 8).
Include labels to explain what is happening in your drawing.
5. Choose one paragraph from the explanation. Decide on a heading for that paragraph. Write down some 'trigger words' (words that trigger the information in your head). Use the heading and trigger words to rewrite the paragraph in your own words without going back to the original text.

APPLYING - Using the information in another way

6. **Poetry**
Write a poem or a rap song about the power and fury of a tornado.
7. **A Day in the Life of a Tornado**
Describe your short life as a tornado; how you started, what you did with your day, and how it all ended.

ANALYSING - Using an infographic to tell the story

8. Create a fun INFOGRAPHIC to explain all the information you have read about tornadoes.
An infographic is a combination of pictures, diagrams, symbols, flow charts, words and numbers to show information in a fun and interesting way.

CREATING - Coming up with new ideas

9. You are a tornado chaser, someone who is fascinated by tornadoes and tries to get as close as possible to the action. Design a vehicle that will protect you from the full force of the tornado if you make a mistake and get too close.
Remember to include diagrams, labels, and descriptions to explain your interesting ideas.

EVALUATING - How good is this explanation

10. A well written explanation should start with a clear description of the topic, the ideas should be organised in a clear sequence, it should have a conclusion which wraps-up what has been said at the end, and the information should be written in a way that holds your interest.

AND ... you must be able to understand what the author was trying to explain!!

Do you think this explanation was well written? Give a reason for each of your ratings.

◆ **How good was the introduction?**

Did you get hooked in by the first paragraph? How did the author do that? Humour, imagery?
Did the author make it clear to you what this explanation was going to be about? How?

Introduction : Rate 1-10

◆ **Were the ideas organised in a sequence or steps?**

Did the paragraphs flow from one idea to the next?
Did the author use words like 'first', 'then', 'next' to help with this?

Organisation : Rate 1-10

◆ **How well did the author wrap-up the explanation**

Was there a summarising statement - an attempt to summarise the information in 1 or 2 sentences?
Was there a reflective statement - a personal comment from the author about the topic?

Conclusion : Rate 1-10

◆ **Was the information written in an interesting way?**

What kept you interested? Was it anything to do with the way the author presented the information?
Did the author makes comparisons or uses imagery (similes and metaphors) to help explain the technical ideas?

Writing style : Rate 1-10

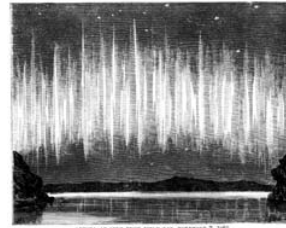
◆ **Was the explanation clear? Did you get it?**

Do you understand what the author was trying to explain? Are there some bits that you still don't get?

Clarity : Rate 1-10

What Causes the Aurora?

The **Aurora Borealis** (in the Arctic) and the **Aurora Australis** (in the Antarctic) are some of nature's most spectacular and beautiful phenomena. They are caused by the collision of **particles** from space with **atoms** in the Earth's upper atmosphere. As a result, they release energy which lights up the sky.



These lights, known as the aurora, have always fascinated people. They possess an almost mystical beauty. Fairy-like, they dance above the Earth in huge shapes, varying in colour from green and yellow to red and violet. Sometimes, they are like giant curtains rippling across the night sky. Sometimes, they are a gentle glow of delicate colours or flickering streaks. At other times, they look like huge curved walls with soft glimmering rims. Sometimes they are peaceful arcs.

Aurora are seen as soon as it is dark. Viewing is always better on a moonless night away from any other lights such as those created by towns or cities. They occur inside the arctic and antarctic circles, between latitudes 60° - 72°. They are commonly seen in Canada, Alaska, Scandinavia, northern Russia and, of course, Antarctica. At times, they can be seen in mid-latitude places such as Europe and the northern United States, South America, Australia and New Zealand. Very rarely, they have also been seen in the tropics.

From space, the aurora look like enormous rings of light around the poles. It is important to note that they are centred around the Earth's **magnetic poles**, not the **geographic poles**, which are hundreds of kilometres away. It is the magnetic poles that are influential in pulling the space particles which are caught in the Earth's magnetic fields towards the poles.

Solar winds, also known as solar storms, are vast flows of **plasma** which travel continuously outward from the Sun. They travel at extremely high speeds, moving along magnetic pathways and whirling like tornadoes. They take about 40 hours to reach Earth. When the energized particles of the plasma meet with atoms in the earth's upper atmosphere, it causes energy to be released which we see as lights in the sky.

When there are large disturbances or explosions on the Sun, the solar winds increase and the aurora are also bigger and brighter. The colours of the aurora depend on the gas chemistry high up in the earth's atmosphere and the height of the collisions between the **plasma particles** and the Earth's **gas atoms**. Yellow and green lights are the most common colours and result from collisions with **oxygen** at levels between 100 and 300 kilometres high. Higher up, collisions with oxygen cause red lights. Other gases such as **hydrogen** and **helium**, when met up high, make blue and purple light.

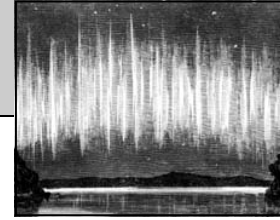
As a matter of interest, aurora can be seen on other planets too, notably Saturn and Jupiter. In a similar way to what happens on Earth, particles travelling from the Sun are caught in the magnetic fields of these planets and collide with gases in their atmospheres. This causes the illuminations we call aurora.

Headings and Trigger Words

Use this column to write down a heading and trigger words to summarise each paragraph (SharpReading Stage 5B)

What Causes the Aurora?

Set 5:4 Activities



REMEMBERING - What are the facts

1. What are the best conditions for viewing the aurora?
2. Where are you LEAST likely to see the aurora?
3. Write 3 questions like the ones above. You must be able to find the answers in the explanation.

UNDERSTANDING - Show that you understand the information

4. Draw a diagram, to show you understand what the aurora look like from space. You could use this picture in your infographic (Activity 8).
Include labels to explain what is happening in your drawing.
5. Choose one paragraph from the explanation. Decide on a heading for that paragraph. Write down some 'trigger words' (words that trigger the information in your head). Use the heading and trigger words to rewrite the paragraph in your own words without going back to the original text.

APPLYING - Using the information in another way

6. **Poetry**
Write a poem or a rap song about the magical aurora lights that dance across the night sky.
7. **Short Story**
Use what you have learnt about the aurora to write a short story about a young boy or girl's first experience of the strange lights at night. Is this a visit from aliens?

ANALYSING - Using an infographic to tell the story

8. Create a fun INFOGRAPHIC to explain all the information you have read about the aurora.
An infographic is a combination of pictures, diagrams, symbols, flow charts, words and numbers to show information in a fun and interesting way.

CREATING - Coming up with new ideas

9. A new business opportunity - a space shuttle service that can provide tourists with a view of the aurora from space. Design a space craft especially for this purpose; one which will get them into space and back down again quickly, with great viewing lounges and all the extras they will need for the journey. Design a logo for your new company and some advertising material to get people interested.
Remember to include diagrams, labels, and descriptions to explain your interesting ideas.

EVALUATING - How good is this explanation

10. A well written explanation should start with a clear description of the topic, the ideas should be organised in a clear sequence, it should have a conclusion which wraps-up what has been said at the end, and the information should be written in a way that holds your interest.

AND ... you must be able to understand what the author was trying to explain!!

Do you think this explanation was well written? Give a reason for each of your ratings.

◆ **How good was the introduction?**

Did you get hooked in by the first paragraph? How did the author do that? Humour, imagery?
Did the author make it clear to you what this explanation was going to be about? How?

Introduction : Rate 1-10

◆ **Were the ideas organised in a sequence or steps?**

Did the paragraphs flow from one idea to the next?
Did the author use words like 'first', 'then', 'next' to help with this?

Organisation : Rate 1-10

◆ **How well did the author wrap-up the explanation**

Was there a summarising statement - an attempt to summarise the information in 1 or 2 sentences?
Was there a reflective statement - a personal comment from the author about the topic?

Conclusion : Rate 1-10

◆ **Was the information written in an interesting way?**

What kept you interested? Was it anything to do with the way the author presented the information?
Did the author makes comparisons or uses imagery (similes and metaphors) to help explain the technical ideas?

Writing style : Rate 1-10

◆ **Was the explanation clear? Did you get it?**

Do you understand what the author was trying to explain? Are there some bits that you still don't get?

Clarity : Rate 1-10



APPENDIX

A. Teaching Notes

SharpReading ONLINE	
- A Framework for Whole School Reading Instruction	49
SharpReading ONLINE	
- A Guided Reading Routine	50
Learning Outcomes in Reading, Science, and Writing	51
Using Follow-Up Activities	53

B. Exemplars for modelling

UNDERSTANDING - Heading and Trigger Words	55
ANALYSING - What is an Infographic?	56
EVALUATING - Annotated explanation	57
- Evaluating exemplar	58

SharpReading ONLINE

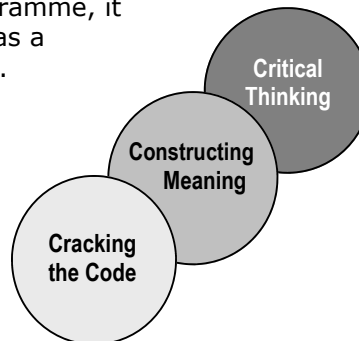
A Framework for Whole School Reading Instruction

The value of recognising a developmental continuum

When putting together an instructional reading programme, it makes sense to see the acquisition of literacy skills as a developmental progression as shown in the diagram.

Initially, the space in the head of the beginning decoder is completely taken up 'cracking the code' - looking for familiar patterns and shapes; something that will help them make sense of the squiggles on the page.

As the reader develops fluency with basic decoding strategies (recognising letter sounds and shapes, blends, some sight words) they have the space in their heads to move on to a higher order task, constructing meaning from the words and sentences. As they are taught comprehension strategies and given the chance to habitualise these, there is now room for higher order critical thinking.

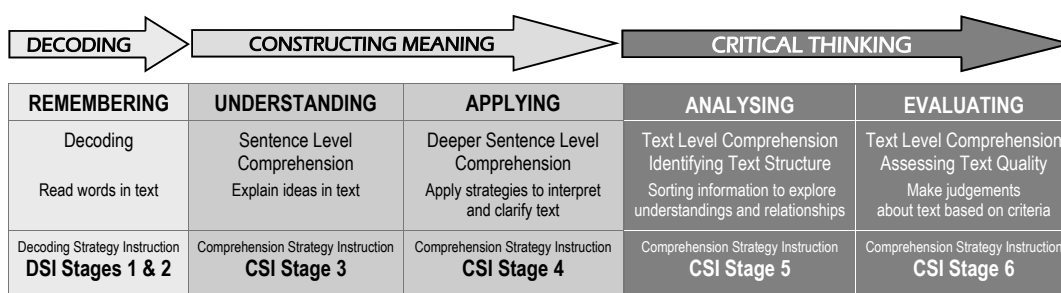


Each of these stages provides a foundation for the next. We are all too familiar with the student who decodes fluently but has little understanding of what they have read. It is very important to spend time teaching them how to construct meaning from sentences before embarking on critical thinking responses to text or open ended inquiry learning.

The SharpReading ONLINE Developmental Continuum

Our aim has been to produce a one page framework that will guide schoolwide reading programmes through this process.

Below is an abridged version of our framework. It provides the structure needed to move students from Decoding through Constructing Meaning and on to Critical Thinking, ensuring that there is explicit instruction of all the reading strategies they need in a step-by-step progression with opportunities to habitualise each step and display fluency before adding in the next level of complexity.



SharpReading ONLINE provides quality professional development for individuals or a school staff to upskill themselves in the delivery of these stages.

A Training Model that Works

This is step-by-step scaffolded learning available 24/7. Teachers can work at their own pace or coordinate with other staff to explore the teaching steps together.

For more information, recommendations from other schools, and data on the effectiveness of this training programme, visit www.sharpreading.com

SharpReading ONLINE

A guided reading routine that gets results

The framework or developmental progression on the previous page takes care of "What do I teach?" The next question is "How do I teach it?". After many years of experimentation and trialing we have come up with a guided reading routine which delivers. We call it "The Three Steps".

Traditional guided silent routines foster passivity as the student waits for the teacher to unfold the game plan for the day. The teacher makes all the decisions beforehand and maintains the locus of control, often disrupting the flow with 'teachable moments'.

The prerequisites for our Three Steps routine are as follows :

1. It must transfer the responsibility for unpacking the text from the teacher to the students.
2. It must be very predictable and highly structured so that the students (and the teacher) are freed up to focus on strategy practice.
3. It must be about guided practice not new learning (explicit instruction occurs in a different setting).
4. It must be simple and easy to follow.

Here is a summary of the routine. To see the routine in action and learn how to implement it with your reading groups we recommend you sign up for our online training programme which can be found at **www.handyres.com**

THE THREE STEPS

For each chunk or paragraph of text

STEP 1: Read Silently (All CSI Stages)

Practice using strategies independently

STEP 2: Detailed Retelling

Use "I think that means " (CSI Stage 3) and the DEEP FIVE comprehension strategies (CSI Stage 4) to unpack sentences

"Have we got the message right?"

STEP 3: Clear the Roadblocks (All stages)

The chance to 'fix-it-up' when constructing meaning has broken down

Decide on a heading and trigger words (CSI Stage 5B)

Look for evaluation criteria (CSI Stage 6)

Learning Outcomes in Reading

Students using the instructional texts in this resource will be fluent decoders who need to habituate comprehension strategies to construct meaning and then think critically about it. We refer to this as CSI - Comprehension Strategy Instruction. The learning outcomes listed here start at Stage 3 of our SharpReading developmental continuum.

SharpReading ONLiNE - CSI Stage 3 Sentence Level Comprehension

LO: Unpack sentences and monitor own reading for comprehension

I will know I can do this if, when I am reading, I can ...

- ◆ Put sentences in my own words using "I think that means..." to check whether I have got the message right
- ◆ Recognise when there are roadblocks (I haven't got the message right)

SharpReading ONLiNE - CSI Stage 4 Deeper Sentence Level Comprehension

LO: Use the Deep Five comprehension strategies to check and clarify meaning and to overcome any roadblocks to comprehension

I will know I can do this if, when I am reading, I can ...

- ◆ Visualise what the words are saying
- ◆ Make connections to something I already know to clarify ideas
- ◆ Ask myself questions about the text
- ◆ Form and revise an hypothesis about what is going on in the text
- ◆ Make connections to something somewhere else in the text

SharpReading ONLiNE - CSI Stage 5 Text Level Comprehension

LO: Identify Non-fiction Text Structure

I will know I can do this if, when I am reading, I can ...

- ◆ Use Headings and Trigger words to create a memorable structure from a non-fiction text

SharpReading ONLiNE - CSI Stage 6 Text Level Comprehension

LO: Evaluate Non-fiction text

I will know I can do this if, when I am reading, I can ...

- ◆ Use established criteria to make judgments about the quality of the writing in an explanation

Learning Outcomes in Science

Forces of Nature focuses on earth systems - the water cycle and extreme weather conditions - to provide a knowledge base for students to conduct their own investigations and further their understanding of scientific concepts.

New Zealand Curriculum - Levels 3 and 4

Investigating in Science

- Build on prior experiences, working together to share and examine their own and others' knowledge.
- Ask questions, find evidence, explore simple models, and carry out appropriate investigations to develop simple explanations.

Planet Earth and Beyond

Investigating Systems - Investigate the water cycle and its effect on climate, landforms, and life.

Learning Outcomes in Writing

The graded texts in this resource provide strong models of the explanation genre.

Learning to look for headings and trigger words during guided reading (CSI Stage 5) and as a follow-up activity, and the analyzing work done converting written text into an infographic, all help the reader to understand the structure of the explanation genre. The work done evaluating the texts helps to establish criteria for their own writing.

The logical progression for students having explored the structure and language features of the explanations during reading instruction, is to have a go at writing their own.

Purpose of Explanations in 'Forces of Nature'.

- To provide a clear age-appropriate explanation of a natural phenomenon.

Text Structure

1. Introduction
 - a definition or statement of the subject to be explained
 - may include a hook to arouse reader interest - a question, anecdote, reference to reader's prior knowledge
2. A sequence of paragraphs which
 - establish the necessary conditions
 - outline the stages
3. Conclusion - a wrap-up
 - may include a summarizing statement - no new information
 - may include a reflective statement - a personal comment by the author

Language Features

- Uses technical terms associated with the subject
- Includes linking words and phrases expressing sequence (firstly, after, then, next, finally)
- Provides age-appropriate details and information to support ideas
- Mixture of style - informal - use of emotive language and imagery to enhance descriptions - and formal (factual)

Students can ...

- Identify the text structure and language features in the explanations they read
- Use criteria they have developed to critique explanations
- Use their knowledge about text structure and language features in their own explanation writing

USING FOLLOW UP ACTIVITIES

COMPREHENSION STRATEGIES with BLOOM'S TAXONOMY

The purpose

The primary intention of follow-up activities is to equip our readers with strategies to help them think more deeply about what they have just read; to show them how and to give them practice at deeper processing and higher order thinking.

Let's have a look at how this is accomplished with the activities in this resource. These activities are not busy work. They are an important part of comprehension strategy instruction and develop 'after reading' comprehension; meaningful, independent work for students while other small group instruction is taking place.

Allow choice - do not expect all activities to be completed!!

REMEMBERING – What are the facts

This is the most basic level of processing information; answering 'right there' questions or literal comprehension. This requires the reader to remember a fact or be able to revisit the text and find it.

There is no inferential thinking involved here but for the less confident reader this is a non-threatening place to start, so it still has its place. A slightly more challenging spin is put on this by asking the student to come up with their own literal questions as well so there is some processing of the text required.

UNDERSTANDING - Show that you understand the information

Understanding the message of the passage goes beyond the ability to decode the words. This is where the explicit teaching of strategies to construct meaning starts to have an impact.

Two activities are used to build on the work done to construct meaning during the guided reading lesson.

1. Draw a picture to show you understand ... (a concept in the text)

Drawing an accurate picture or diagram can only be achieved if meaning has been constructed first. If that has not happened then the reader's lack of understanding is exposed and revisiting the text to find and clarify meaning is necessary. This is a starting point for the more complex task of creating an infographic - a visual representation of all the information - under Analysing.

3. Heading and Trigger Words - rewrite a paragraph

Deciding on a heading and identifying words that will trigger the paragraph information in the reader's head is taught explicitly and practiced 'during reading' as part of CSI Stage 5B of and is an important part of developing the reader's 'Big Picture' or text level comprehension of a text. Having to process text this way checks comprehension and develops understanding.

This is a powerful tool for researching information and moves the reader away from a cut and paste mentality. Have a go at this yourself and see how easy it is to create your own writing which has a fresh personal voice.

See page 55 for an exemplar you can use to explain and model this activity with your class.

APPLYING – Using the information in another way

These activities require students to take the information presented in the explanation and rework it in a different way. By creating something in a different genre the reader is given another opportunity to process the information and deepen their understanding.

Activities include writing poems or rap songs, short stories, newspaper reports, picture books for 5-year-olds, and "A Day in the Life..." diary entries all of which should incorporate information from the explanation.

ANALYSING - Using an infographic to tell the story

Taking apart a text that they have read and having to reconstruct the information in a visual format requires an ability to analyse the parts, look for relationships, and expand on these relationships in new, interesting ways.

There are many interpretations of what an infographic is. For the purposes of this resource we have defined it as "a combination of pictures, diagrams, symbols, flow charts, words and numbers to show information in a fun and interesting way."

Having completed the first objective during guided reading - digging into the words for meaning - being now asked to represent the information graphically is a great opportunity for further deeper processing.

It will benefit your readers if you take some time to explain and model what you are looking for in an infographic before unleashing them on this activity. On page 56 you will find some images to help you with that.

CREATING - Coming up with new ideas

Using existing knowledge to create new possibilities and solve existing problems is a complex thinking activity with obvious implications for the life-long learner in our world today.

These activities allow students to problem solve and have some creative fun with the physical phenomena they have been learning about.

EVALUATING - Making judgments

Having carefully constructed the meaning, reworked the information through applying, analysing, and creating, the reader is now in a position to generalize and make judgments about the quality of the writing.

Using the criteria provided the students are asked to pull apart the text and comment on its effectiveness. This has obvious benefits when it comes to students writing their own explanations; they have explored the structure and language of the genre.

See example on page 58

Identifying Headings and Trigger Words

Here is an example of what the formatted students script may look like once readers are working on CSI Stage 5.

These notes are generated during the guided reading lesson and these can be used for completing the 'UNDERSTANDING' follow-up activity.

How Do Waterspouts Form?

Have you ever seen a waterspout? It is similar to a tornado but only occurs over water. It is a whirling pillar of wet air that looks **like the stalk of a gigantic mushroom** connecting the surface of the water to a cloud, or **like a magical beanstalk** reaching up into the sky.

There are two kinds of waterspout: **tornadic and non-tornadic**. They take place in different weather conditions and are formed differently. The most common ones are **non-tornadic** or **fair weather** waterspouts. They start forming on the surface of the water and move upwards towards a low cloud. They are not as dangerous as **tornadic** ones. Tornadic waterspouts are associated with bad weather. They descend downwards from the clouds during a thunderstorm and are the **terrible twin** of the tornado. They have been known to suck up shoals of fish. This explanation looks at the more friendly non-tornadic waterspouts.

Conditions must be just right for the formation of these fair weather waterspouts. Firstly, temperatures must be warm and **humid**, which is the reason that many waterspouts occur in the tropics. Secondly, there must be some wind or movement of rising air. Also, there must be those **puffy cotton wool cumulous clouds** above. Waterspouts form best where these clouds have a flat, dark base which usually means that rain is not far away. If conditions are just right several waterspouts may form under the same bank of clouds.

There are five recognised stages in the formation of a waterspout. The first stage is seen as a dark, circular area on the surface of the water. This is caused by warm air above the water rising and beginning to move in a circle.

In the second stage, a spiral pattern can be seen on the water. As the warm air rises, cooler air rushes in horizontally to replace it, causing the air to spin. This rotating wind continues to increase. As the humid air rises, it forms the tiny water drops that make up clouds. It meets the cloud above, which is heavy with moisture. This begins the **funnel** shape of a typical waterspout.

The third stage sees a ring of spray on the surface of the water and a **turbulent** mist swirling around.

Fourthly, the whole waterspout can be seen. It looks like a solid shape but is really a thin cloud of tiny water drops. It is actually almost **transparent**.

In the final stage, the whirling funnel weakens, often when the cloud above it begins to rain. This cools the warm air feeding the waterspout and it ends. Most waterspouts last only about five or ten minutes although large ones have been known to continue for up to an hour.

Waterspouts are the result of a clever combination of wind, water and air temperature. Their appearance is always a reminder of nature's **awesome** power.

Headings and Trigger words

Use this column to write down a heading and trigger words to summarise each paragraph.

Introduction

- wet air
- stalk

Waterspout types

Tornadic

- bad
 - clouds
 - downwards
- Non Tornadic
- fair weather
 - surface
 - upwards

Right Conditions

- humid
- wind - rising
- cumulous

First Stage

- circular
- rising

Second Stage

- spiral
- funnel

Third Stage

- spray
- mist

Fourth Stage

- solid
- transparent

Final Stage

- rains
- weakens
- 5min - hour

Conclusion

- combination
- power

What is an Infographic?

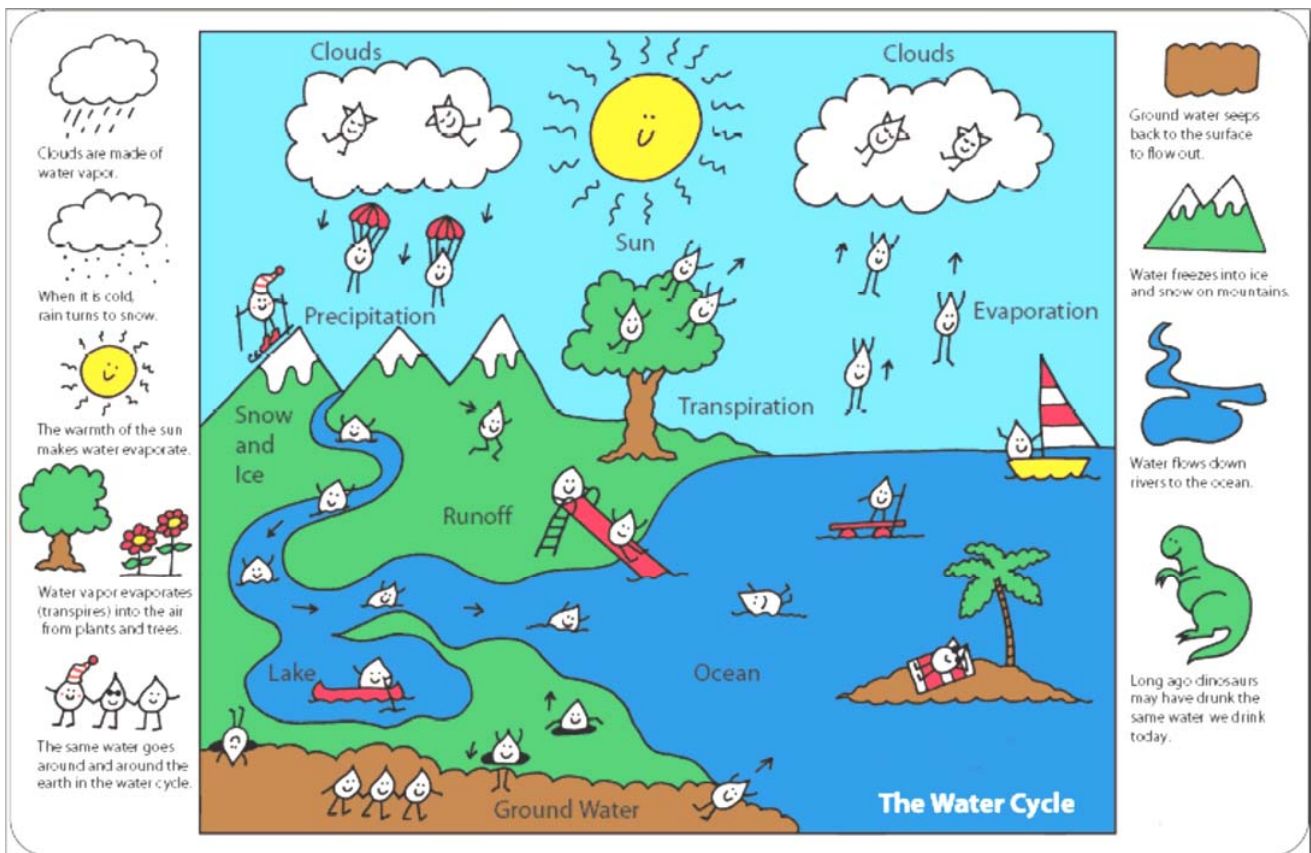
An infographic attempts to 'tell the story' using pictures, diagrams, and symbols. While words, captions and headings may be part of an infographic, it has been said that a good test of an infographic is that if you take away all the words, what is left will still tell the story.

Here are some examples of very simple infographics. Are you able to 'tell the story' without needing any words?



Turning the information in the explanations you have read into an infographic can be lots of fun and a real challenge. It also makes you think a lot more about the information and helps you remember it.

Here is a fun infographic from the explanation "What is the water cycle?"



Annotated Explanation

Introduction

Author asks a question as a hook - this also clearly establishes what the explanation is going to be about.

Includes a definition to establish the topic
Makes a connection to a similar phenomena (tornado)

Uses imagery to help establishing a connection to prior knowledge for the reader.

Organisation

Series of sequential paragraphs

- Definition of two kinds of waterspout and establishes the focus for this explanation.
- Conditions for a waterspout to form
- The 5 stages in formation

Each paragraph includes signpost sentences

- Different kinds ...
- Conditions for formation ...
- Five stages ...

Includes sequence words

- first stage ...
- second stage ...
- final stage ...

Writing Style - use of language features

Includes technical words (***bold italics***)

Uses similes and emotive language for effect (**bold**)

Conclusion - Wrap Up

No new information introduced.

Includes

- a summarising statement
- a reflective statement.

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Evaluating Exemplar

EVALUATING - How good is this explanation

10. A well written explanation should start with a clear description of the topic, the ideas should be organised in a clear sequence, it should have a conclusion which wraps-up what has been said at the end, and the information should be written in a way that holds your interest.

AND ... you must be able to understand what the author was trying to explain!!

Do you think this explanation was well written? Give a reason for each of your ratings.

♦ **How good was the introduction?**

Introduction : Rate 1-10

Did you get hooked in by the first paragraph? How did the author do that? Humour, imagery?
Did the author make it clear to you what this explanation was going to be about? How?

♦ **Were the ideas organised in a sequence or steps?**

Organisation : Rate 1-10

Did the paragraphs flow from one idea to the next?
Did the author use words like 'first', 'then', 'next' to help with this?

♦ **How well did the author wrap-up the explanation**

Conclusion : Rate 1-10

Was there a summarising statement - an attempt to summarise the information in 1 or 2 sentences?
Was there a reflective statement - a personal comment from the author about the topic?

♦ **Was the information written in an interesting way?**

Writing style : Rate 1-10

What kept you interested? Was it anything to do with the way the author presented the information?
Did the author makes comparisons or uses imagery (similes and metaphors) to help explain the technical ideas?

♦ **Was the explanation clear? Did you get it?**

Clarity : Rate 1-10

Are you now able to understand what the author set out to tell you?
What are the bits that you still don't get?

Evaluating "How do waterspouts form?"

Introduction: Rating 9

I thought this was a very good introduction. The author hooked me in by asking a question. I had to think about whether I had seen one of these before and that got me wondering about what a waterspout actually was. Then came a description and there were two similes which gave me a clear picture of what a waterspout might look like even if I hadn't seen one.

Organisation: Rating 9

It was very clear where this was going. The first paragraph sorted out that there were two kinds of waterspouts and told me that this was only going to be about one of them. It would have been too hard to do both in one explanation.

The next paragraph was clearly about what weather conditions had to be in place before a waterspout could form and from there on it went through numbered stages so I could easily follow the sequence.

Conclusion: Rating 10

I like the way the explanation was wrapped up. There was no new information but it reminded me that you need wind, water and the right air temperature - a summarising statement - and then the author had a reflective statement about the awesome power of nature which was a nice way to finish off.

Writing Style: Rating 9

The similes at the beginning got me really interested. I wanted to find out more about what waterspouts were like and how they happen. Puffy cotton wool clouds, the terrible twin, turbulent and transparent were all interesting words or ways of saying things that kept me interested and helped me understand the way waterspouts work.

There were some technical words which you have to have in an explanation and they were explained pretty well.

Clarity: Rating 6

I'm still not too sure about the different stages so I only gave it a 6. Why does the water begin to move in a circle in Stage 1? It goes from a circle to a spiral to a ring which I don't really get.

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